MARINE REVIEW.

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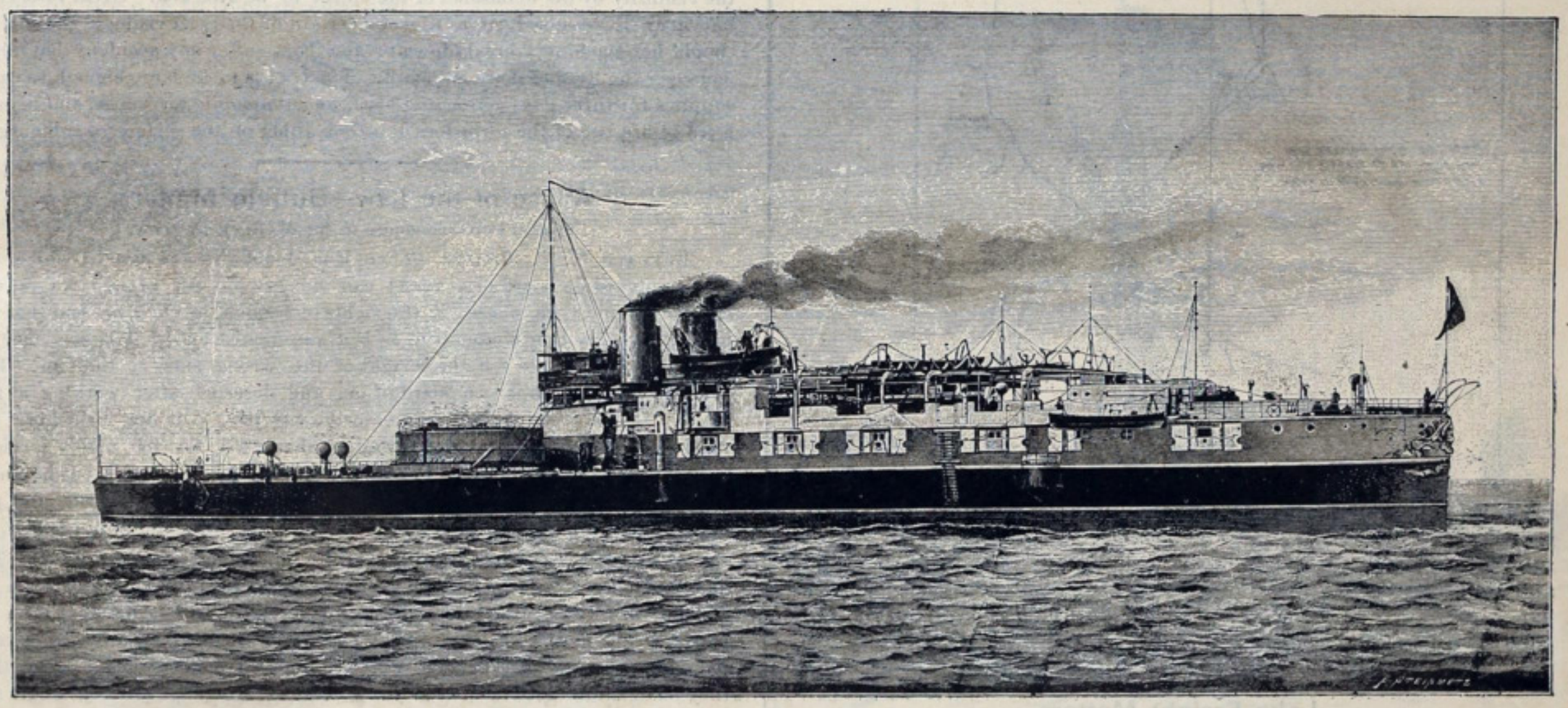
The Loss of the Victoria.

The awful disaster to the British battle-ship Victoria, the queen's namesake, which has shocked the whole civilized world, on account of the great sacrifice of life, was at first looked upon as a severe lesson to the navies of the world, from which some decided changes in the construction of ships of war would result in the future. Comment from naval experts so far brought out does not, however, establish any direct conclusions, although various opinions have been given on the efficiency of the compartment system and the advantages of the ram in naval warfare.

The engraving of the Victoria presented here is from a picture of the vessel published in Engineering of London shortly after she went into commission in 1889. She is 360 feet long over all and 70 feet broad, and her mean draught is 27 feet, with a displacement of 10,700 tons. The power developed by her machinery at the official trial was 14,244 indicated horse power during a trial of four hours duration, which would give her a speed of about 17 knots. She could carry 1,000 tons of coal, sufficient to enable her to steam from 8,000 to 9,000 knots. She and her sister ship the Sanspareil are similar in design to the Rupert, Conqueror and Hero. They carry in a single turret forward two powerful guns, each of 110 tons weight, and behind this turret there is a structure over about two-thirds of the length of the vessel rising above the upper deck, within and upon which additional powerful auxiliary armament is carried, so that in the matter of heavy guns, which contributed largely to the sinking of the Victoria, the vessels of her class carry above the upper deck more weight than any of the various kinds of ships in the British fleet. The Victoria was protected about one-third of her length amidships by a belt of compound armor 18 inches thick and 7 feet 6 inches wide. Above this belt there was an armored deck 3 inches thick, and before and abaft the belt were sunken decks 3 inches thick, continuing to the extremities of the ship. A longitudinal bulkhead extended through the vessel and there was besides a number of cross bulkheads dividing her into compartments on each side of the main longitudinal division.

This description of the vessel will serve to show in all the discussion relative to the collision which caused the ship to turn over and go to the bottom, importance has been attached to the heavy armament above the main deck and the arrangement of the compartments, which were opened up on one side by a ripping blow from the Camperdown, and in which the bulkhead doors were not closed. As explained in dispatches giving detail of what happened after the two vessels had come together during the maneuvering tactics of the squadron, Admiral Tyron of the Victoria evidently had no thought of his vessel capsizing from the effect of the blow she had received. He had succeeded in restoring discipline and had his vessel directed for shoal water, with the men trying to close bulkhead doors, when, after about ten minutes run, the ship all at once leaned over to starboard and with a great roll and plunge buried her bow beneath the sea. Then followed the awful scenes among the struggling hundreds of men that have been so graphically described in all accounts of the disaster, and which have shaken English confidence in heavy vessels.



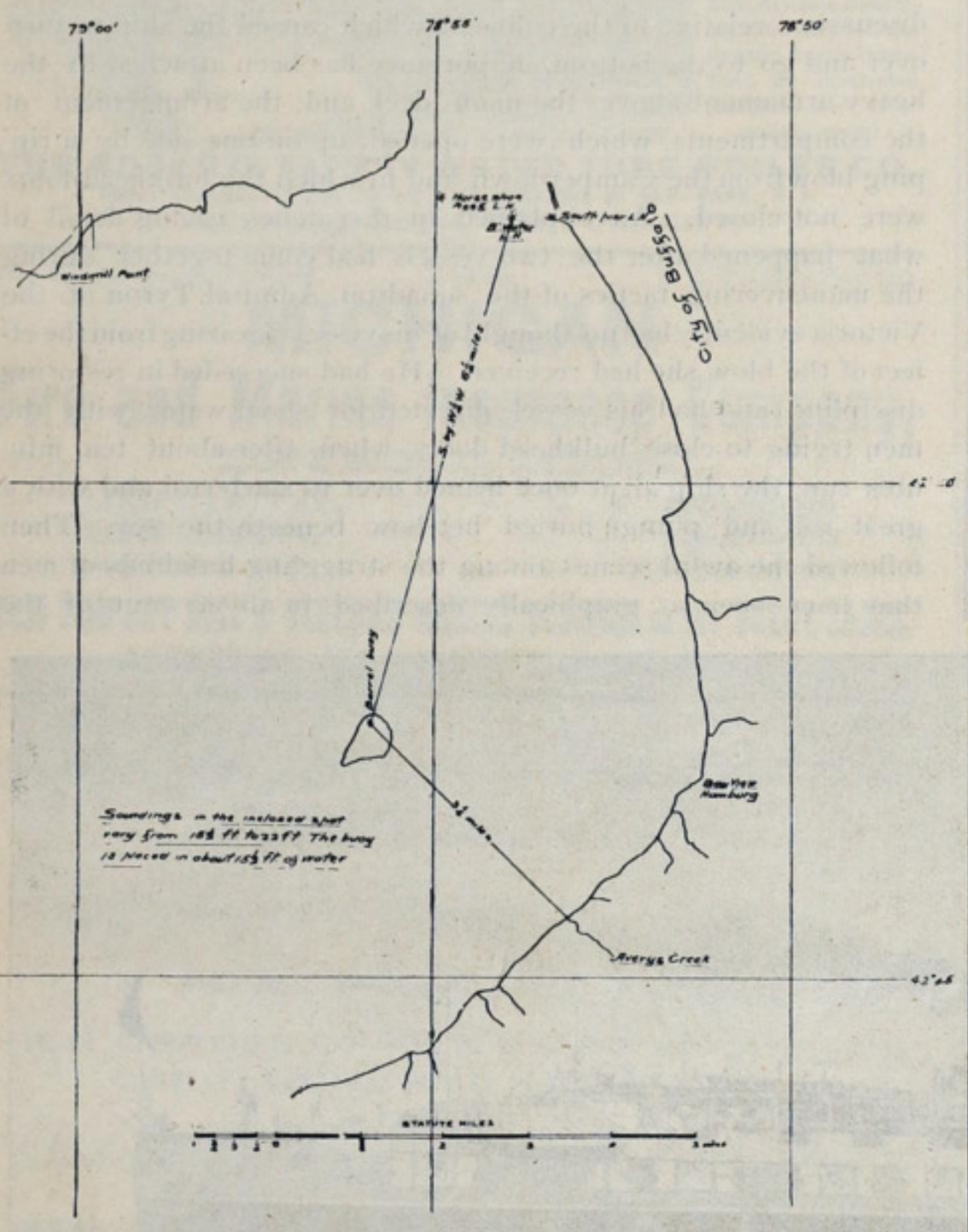
THE H. M. S. VICTORIA—SUNK IN THE MEDITTERANEAN.

Whether smaller boats will be built hereafter or, in fact, any great change in the British naval policy be made on account of the accident is, however, still a great question. In this case the compartment system may be said to have failed of its purpose because the water-tight doors were not closed in time to confine the water to the damaged portion of the vessel, but it is absolutely necessary to keep these doors open most of the time owing to the impossibility of securing air to breathe when they are closed, especially in tropical climates. Some electrical or other device may be found to close these doors under such circumstances.

It may be said also that the accident affords another illustration of the terrible effectiveness of the ram in naval engagements, but the efficiency of the ram may easily be over-estimated, for actual experience in warfare has proved that it is exceedingly difficult and in most cases impossible to ram an antagonist that is fully aware of the purpose of the enemy, as attack can be generally defeated by sharp maneuvering, while the vessel making the attempt must expose herself at her most vulnerable point to an almost irresistible fire.

Seneca Shoal.

Major E. H. Ruffner, corps of engineers, U. S. A., furnished us with a tracing from which the accompanying illustration of the shoal spot recently struck by the steamer Seneca is made. He says: "We have sounded the place thoroughly and located it exactly. While there is a large area with a less depth than 20 feet, there is not an extensive ridge, or area, of as little as 16



feet. One cast of 15 4-10 feet was found, and quite a number of 16 feet, but the shoal runs in general 17, 18 and 19 feet. A barrel buoy, placed by the Lehigh Valley people, marks the spot, and I hope the light house inspector will mark it with a can buoy. No large vessel should be in this vicinity, but the shoal is quite a distance in the lake."

Lake Freight Matters.

Occurrances of the past ten days in the iron mining region of Lake Superior, together with the suspension of grain shipments to the seaboard, would certainly have prompted vessel owners to tie up a very large part of the tonnage of the lakes, if it were not for general confidence in a return to active business wirhin a short period. The suspension of mining operations has been so general, however, that even an early clearing up of financial troubles throughout the country may not be of importance enough to overcome other special difficulties that have depressed the iron ore business in particular, and there are some leading men in the industry who are of the opinion that a return to normal conditions need not be expected during the next two months. It is now certain that the output of ore from all Lake Superior mines can not exceed 60 per cent. of last year's product, which would be about 5,500,000 tons.

The greatest surprise is the absence of any movement in grain, notwithstanding the low prices at which all cereals are selling and the certainty of a demand in Europe for the grain now in American elevators. The question of wages to come up in the iron industry on July 1 may also prove a drawback in trade, and altogether it would seem as though disadvantages have all come to iron men at once. Rates of freight on "wild" cargos of ore for a week past have been the lowest ever recorded, and still they have been only nominal, as the question with the vessel owners has not been one of rates but to secure cargoes at almost any price.

Designs for the Submarine Boat.

Special Correspondence to the MARINE REVIEW.

WASHINGTON, D. C., June 29.—Secretary Herbert has appointed a board, to consist of Lieut. Commander Sperry, Prof. Alger and Naval Constructor Capps, to consider and report upon the plans and bids submitted to the department for the construction of the submarine boat authorized by congress. These bids were opened at the navy department a few days ago, and were as follows: From George C. Baker, Washington, D.C., to build in nine months, $130,000; John P. Holland Torpedo Boat Company of New York, twelve months, $150,000; Marens Rutherburg, Philadelphia, Pa., eighteen months, $175,000; Lemon Lake, Baltimore, Md., (design only); Cowles Engineering Company, Brooklyn, N. Y., twelve months, $120,000; Clarence B. Shultz of Philadelphia, Pa., (design only), on commission of 6 per cent.; John Ambrose, Youngstown, O., estimated cost $75,000, but no bond; Albert Bosshoerd of Philadelphia, Pa., (design only); O. Bruebaker, Alleghany, Pa., (design only).

From a cursory examination of the plans submitted by persons who propose actually to built the craft, it does not appear that any novel ideas have been evolved by them. The Baker boat has already been a subject of test by the navy department. The Cowles boat is understood to be of the Nordenfeldt pattern tried in the British navy. The primary object of this craft, for which congress made an appropriation of $200,000, is to run submurged under torpedo nets around the sides of ships, fit a torpedo to the bottom, set it off, and disappear before being discovered. The general design of the vessel is left entirely to the contractor and only general requirements in her construction are demanded by the department. The most important of these requirements are safety, certainty of action when submurged, endurance, both submurged and on the surface, speed when on the top of the water and means for the visibility by the helmsman of the object to be attacked. Great reserve of buoyancy is required, so as to make certain of the craft rising to the surface should her machinery break down or the boat suffer any accident that might endanger the lives of those on board. The boat is to be large enough to carry supplies for three days action and also five auto-mobile torpedoes, and is to be fitted to fire two of the torpedoes at a time either on the surface or submurged.

Abuse of the Law—Buffalo Matters.

Special Correspondence to the MARINE REVIEW.

BUFFALO, N. Y., June 29.—There is no doubt that the law by which the men employed on board of a vessel can tie her up for unpaid wages was enacted to meet an abuse of the rights of seamen, but it is too bad that the possibility of another abuse about as bad was created by it. The schooner H. D. Alverson has lately felt the weight of the wrong side of the law. Two years ago a man shipped on board of her and deserted after working a few hours. It is said that he refused to receive any pay. On her visit here last week she was tied up on a libel claiming about $31 for the man's services. Capt. Gundersen was inclined to resist the claim and stand trial, but he found out just what the attorney for the seaman knew all along, that it wouldn't pay him to fight, so he compromised for about half the claim and went his way.

This port is standing the falling off in business remarkably well. The fleet continues very large in spite of the almost total dropping off of grain receipts from Chicago and the failure of ore receipts. In fact the stagnation has hardly struck us at all as yet. Canal rates have declined steadily for several days, but everybody knows they were too high for midsummer, higher than they have been before in a dozen years. This is a strange state of affairs and possible only under most exceptional conditions. Should the rates go very much lower there may be a chance for the floating elevators. They were actually needed last season to keep the canal alive, but when rates went up no boat would look at them. Anticipating a big demand for floaters out of the pool, two or three new ones were built by various parties, but some of them have not yet been equipped. Ryan's elevator at Ferry street on the Niagara is about the only one out of the pool that has done anything so far.

The Tonawanda strike has kept our lumbermen rather busy receiving cargoes that were intended for that port. Had Buffalo been so minded and had there been docks at hand the Tonawando business could largely have been transferred here and retained, but the connections between the two ports are so intimate that nothing of the sort has been thought of. The refusal of the Tonawanda union to accept the overtures of the dealers after virtually accepting them has widened the breach and no compromise is now looked for.

Official Numbers and Tonnage.

The bureau of navigation, E. C. O'Brien commissioner, assigned official numbers and tonnage to the following lake vessels during two weeks ending June 42: Steam—Idle Hour, Buffalo, N. Y., 347.93 tons gross 283.62 net, No. 100,559; Francis A. Bird, Buffalo, N. Y., 14.55 tons gross, 7.28 net, No. 120,937; City of Alpena, Detroit, Mich., 1,735.51 tons gross, 1,282.40 net, No. 126,974; H. E. Runnels, Port Huron, Mich., 862.09 tons gross, 694.41 net, No. 96,230; Manitou, Chicago, Ill., 2,944.66 tons gross, 2,391.55 net, No. 92,521. Unrigged—Clara, Sandusky, O., 16.46 tons gross, 19.46 net, No. 34,225. Sail—Elvira Hunter, Port Huron, Mich., 25.00 tons gross, 23.75 net, No. 136,367.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company.....	$100 00	$.....	$.....
Champion Iron Company.....	25 00	.....	.....
Chandler Iron Company.....	25 00	.....	40 00
Jackson Iron Company.....	25 00	.....	75 00
Lake Superior Iron Company.....	25 00	.....	.....
Minnesota Iron Company.....	100 00	.....	60 00
Pittsburgh & Lake Angeline Iron Co.....	25 00	.....	.....
Republic Iron Company.....	25 00	.....	9 25
Ashland	25 00	.....	.....
Section Thirty-three.....	25 00	.....	.....
Brotherton.....	25 00	.....	2 50
Iron Belt.....	25 00	.....	2 75
Aurora.....	25 00	.....	7 00

From a review, elsewhere in this issue, of the awful condition of iron mining matters as they relate to lake shipping, it will be seen that the very best mining companies are quitting or curtailing mining operations just as fast as it is possible for them to do so and are drawing only upon stock piles for supplies to meet the limited sales of the past few months. On July 1 the big Cleveland-Cliffs company will have practically discontinued all work of raising ore at its different mines and the Republic will be in the same condition. Mining forces at the Minnesota, Chandler, Ashland and other properties that are the main-stays of the LakeSuperior region have been reduced to day shifts only, and the services of hundreds of men dispensed with. The general depression in financial circles throughout the country has as much to do with this exceptional condition of affairs as the falling off in the demand for ore due to over-production.

The steamer Pontiac brought to Cleveland, Tuesday, the first cargo of ore from the Biwabic mine, one of the largest of the Missabe mines, about which so much has been said. As this ore is about the same as the Cincinnati ore, the property of the Cincinnati company being a part of the Biwabic tract of land, there is no question about the quality, since the Cincinnati product has been used largely in making iron. The ore was loaded into cars at the mines by steam shovels.

At the recent meeting of the Lake Superior Iron Company in Boston, the membership of the board of directors was increased from seven to nine. The two new members are Messrs. Foster and Young of Boston. The officers are: G. W. R. Matteson, president; A. C. Tenney, secretary, and W. D. Rees, treasurer and general manager.

The report that the Champion Iron Company was about to remove the pumps from its mine was discredited by Cleveland representatives of the company. The Champion has been mining no ore for about a year, but removal of the pumps would mean, practically, abandonment of the mine.

Big Cargoes and Fast Trips.

Big cargoes and fast trips are being reported among vessels that are working on season contracts, notwithstanding the great depression in the general carrying trade. The new Whitney steamer Merida, a duplicate of the S. S. Curry, just turned out by F. W. Wheeler & Co. of West Bay City, is bound down on her maiden trip from Ashland with 3,118 gross tons of ore, or 108 tons more than the Curry took from the same port. As these vessels, which are of the type with engines amidships, were not loaded deeper than about 14 feet 4 to 14 feet 6 inches, the canal draught, their carrying capacity is fully up to all that was expected of them. The Merida goes to the C. & P. R. R. dock, Cleveland, Mack Andrews superintendent, where the Maryland was a few days ago unloaded of 3,134 tons of ore from Escanaba with six hoists in 11 hours and 45 minutes, and an effort will probably be made to better this time.

At 4 a. m. on Monday, the 19th inst., the whaleback steamer Pathfinder, towing the barge Sagamore, left Erie, light, for Ashland and at the same hour on Monday last the boats had returned to Cleveland with about 5,300 gross tons of ore, thus taking up but seven days in the run from Lake Erie ports to Ashland and return, including time of loading. J. W. Westcott, marine reporter of Detroit, calls attention to the fact that on this trip the Pathfinder and tow passed down June 17 at 4:50 p. m., and were down again, bound for Cleveland, on the 25th at 6:20 p. m., making the time of the full round trip, loading and unloading, only 8 days, 1½ hours. This is undoubtedly the fastest tow on the lakes. It is claimed that the Pathfinder, under favorable circumstances, makes 12 miles an hour with her tow.

On her last trip to Duluth, the steamer Thomas Maytham, having a cargo of 2,700 tons of soft coal, was unloaded at the docks of the Pioneer Fuel Company, of which A. E. Botsford is superintendent, in 15½ hours. Four of the Brown Hoisting and Conveying Company's rigs were used in discharging the vessel. This is certainly very rapid work in discharging soft coal.

Two trips between Ashtabula and Escanaba in 7 days 7 hours and 55 minutes is the latest record credited to the Mutual line steamer Corona. One of the trips, not counting time of unloading, was made in three days, 13 hours and 30 minutes.

The new docks at Conneaut are also credited with some fast work in unloading ore. Hawgood & Canfield's new steamer L. R. Doty was relieved of 2,000 tons of ore at that port a few days ago in 12 hours actual working time.

Capt. James Davidson's steamer City of Glasgow, towing the schooners Aberdeen, Paisley and Dundee, arrived in Buffalo Wednesday from Duluth with 261,000 bushels of wheat, the gross freight on which at 3 cents was $7,830.

The Viking Ship.

Within the coming week the Columbus caravels, as well as the Viking ship, about which so much has been written of late, will have passed up Lake Erie on their way to the World's Columbian Exposition. One of these curiosities, the Viking ship, will stop at Buffalo and Cleveland and probably at other places along the route. In the accompanying engraving there is

a good representation of the type of ship in which Leif Ericksen, the Norseman, is reputed, according to some historians, to have discovered America nearly five hundred years before Columbus landed on its shores. The vessel is a reproduction of a Viking ship found thirteen years ago in a mound at Gogstad, near Sandefjord, Norway. Capt. Magnus Anderson, who brought the ship here from Norway with a crew of twelve picked men, obtained notoriety some time ago by crossing the Atlantic alone in a small boat.

Oct. 1 is the date fixed for turning over to the trustees the new Webb Naval Academy and Home of New York.

Spain has adopted the load-line for its merchant ships, and after April 27, 1894, the marking of load-lines on vessels' hulls, according to government rules, will be compulsory.

About Aug. 5 the Lucania, sister ship of the big Cunard liner Campania, will leave Liverpool for New York on her maiden voyage.

Canadians are now talking of a railway between Collingwood on the Georgian bay and Toronto. Ship-canals and ship-railways have been planned for this stretch of territory to cut off the long water haul through Lake Erie and the Welland.

Capt. Alex. McDougall's Patents.*

WRECKING BOAT—SPECIFICATION FORMING PART OF LETTERS PATENT NO. 498,678—DATED MAY 30, 1893—APPLICATION FILED MARCH 23, 1892—SERIAL NO. 426,123—NO MODEL.

This invention, according to the specification, relates to improvements in war vessels, which are adapted for use in times of war for coast and harbor defense, and more particularly to improvements in the means and methods of mounting the guns within said vessels, whereby certain advantageous results are obtained. "Among the advantages," says the inventor, "is to facilitate the handling and operating of the guns; to so mount them, as to normally secure a low center of gravity of the boat, and at the same time bring the guns when loaded within ready access to the powder and shot magazines, and to expose as small a portion as possible of the guns to the action of shot and shell from the enemy. The improved means and methods of operating and handling guns on ships of war, may be used on almost any vessel, and it is to be understood that my present invention is to be construed in the broad sense as being applicable to any and all vessels. The preferable type of war vessel with which I prefer to use my present invention, is that which has been invented by me, and which is described and claimed in application serial No. 403,263, for letters patent of the United States, filed by me.

"Fig. 1 is a side elevation of one of my improved steam war vessels, showing the present invention applied thereto; Fig. 2,

Fig. 1

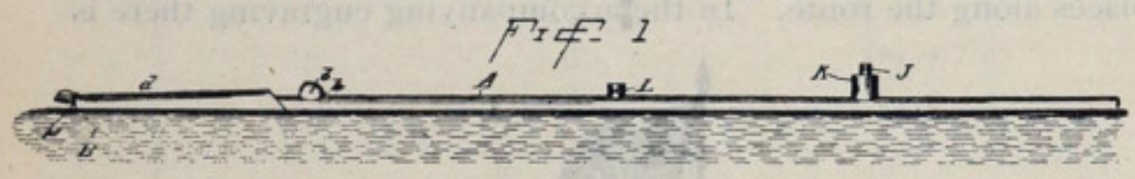


Fig. 2

Fig. 3.

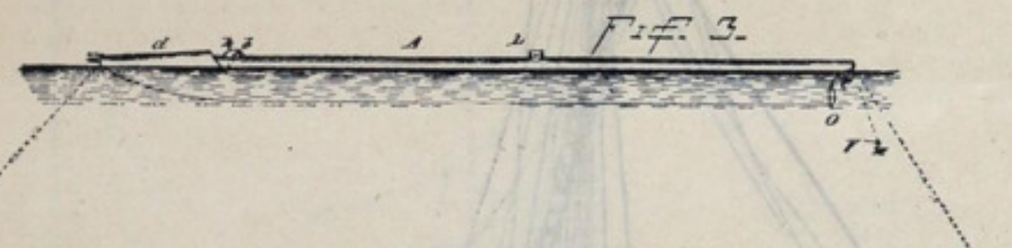
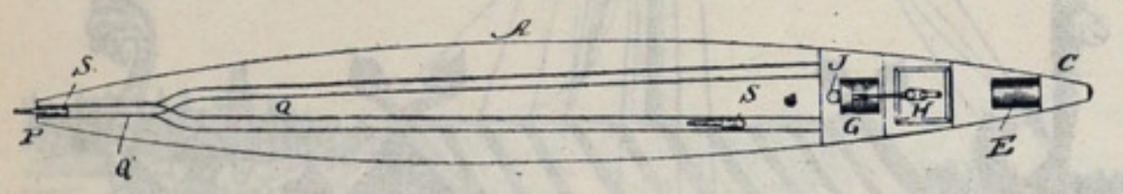


Fig 4



a sectional view of the same; Fig. 3, a side elevation of one of my improved war vessels. adapted to be towed, with the invention applied thereto; Fig. 4, horizontal sectional view of Fig. 1, looking down upon the tracks. In all of the views corresponding parts are designated with the same letters of reference. The present invention is well adapted for use in connection with my improved war vessel, as described in said letters patent, and it will be described herein as being applied thereto, but it should be understood that the invention is capable of application with all vessels, such as men of war, torpedo boats, armored and unarmored cruisers, and boats of the destroyer type. A is the hull, B the bow, and C the stern thereof. D is the water tank within the bow of the boat. E is another water tank within the stern of the boat. These two tanks connect with the water bottom, so that the water therefrom may flow into the water bottom, from which it may be pumped when it is desired to relieve the vessel of water ballast. F is a partition which divides the main portion of the hull from the boiler and engine rooms within the stern. G are the boilers. H is the engine, which is to be of any suitable construction. I is the propeller, which is connected with and is operated by the engine H. Two or three propellers may be used for great speed, if desired. J is the stack from the boiler which passes up through the top of the vessel, and which is protected by a heavy turret K. L is a heavy metallic turret, mounted on the top of the hull about midway between the bow and stern, and this turret serves as a ventilator for the main portion of the vessel, and it may carry one or more suitable machine guns, for keeping off torpedo boats, and to prevent boarding and attacks from small crafts. A ladder M extends down through this turret L, by which the interior of the hull may be reached, and *h* is a conning tower, which is made of very heavy metal, and which is provided with a door at its rear through which it may be entered, The conning tower is provided with the usual slots or holes *b*, to enable the steersman to see ahead, and it contains the steering apparatus, which connects with and operates the rudder O. *c*, *d*, is the auxiliary armor, which is of any suitable construction, and which is placed around the bow portion of the boat, so as to extend a short distance below the load water line.

"The vessel which I have above generally outlined is the preferable form of boat with which I prefer to use my invention, but it is to be understood that any other form of vessel may be used, and that the boiler and engines may be dispensed with, in which case, the boat would have to be towed from place to place, by a tug or other suitable propelling vessel. The improved manner of handling such a vessel by means of anchors passed out through the bow and stern, is clearly described in said application and a reiteration of the same, in this connection, is unnecessary. P is the extreme nose of the vessel which consists of a heavy metallic forging, or casting, and which is hemi-spherical in shape. Instead of making the nose of this particular shape, it may be made conical or hexagonal. This nose is hinged at its upper end by a heavy hinge so as to be swung outwardly, but it will, of course, be understood that it may be hinged at the bottom or at one side, the only requisite being that the nose shall be capable of being opened. Q are inclined tracks of ordinary construction, mounted upon a suitable super-structure R. In the drawings I have shown two of these tracks at the main portion of the hull, but it is to be understood that any number of tracks which can be arranged within the vessel may be used. These tracks Q are parallel or approximately parallel to each other. Q′ is a single track which extends up to the bow or nose of the vessel, and which connects by suitable connecting tracks, or switches, with the track Q. Mounted upon each of the tracks Q is a gun S, which is of any suitable and appropriate construction. The tracks Q at their lower ends are made horizontally, so that the guns S will remain stationary while being loaded.

"The manner of operating and handling guns with this improved apparatus, supposing that two guns are being used, is as follows: The port gun is loaded at the lower end of the track Q and is moved up thereon, and is swung over on the track Q′ so as to open the hinged nose P of the boat. The port gun will now point directly ahead and is then fired, after which it is allowed to move down the track Q′ and is swung back over the port track Q by its gravity. While the port gun is being moved up the tracks and fired, the starboard gun is being loaded, so that when the port gun is brought back the starboard gun is moved up and is switched off to the track Q′, when it is fired in a manner similar to the port gun. The two guns are therefore fired in alternation, so that a very rapid and effective fire can be kept up. It is possible though not desirable to arrange the guns so that when each gun is pointed out through the nose of the vessel, it will be fired automatically. It may be a desirable arrangement to connect the guns together, so that one gun in moving down the inclined track, will help to move the other gun up the same. The powder and shot magazines are placed near the bottom of the track Q, so as to facilitate the loading of the guns. The aiming of the guns is accomplished both by the pilot or steersman, and by the gunner within the hold, the former accomplishing the horizontal aim by keeping the nose of the boat pointing directly at the enemy, and the latter accomplishing the vertical aim of the gun by the proper elevation of the gun, which can be done by anyone skilled in the art of gunnery.

"What I claim as new is as follows: First—A war vessel consisting of a hull having a conical shaped nose, said hull being without sheer, and having a normally high load line, so that when in action the nose of the vessel will be near the water; tracks within said hull, extending from said nose above the waterline, down into the hold of the vessel to a point below the water line; and one or more guns movably mounted on said tracks, and adapted to be pointed out of said nose, with muzzle of said gun, outside of the vessel, and fired, substantially as set forth. Second—A war vessel, consisting of a hull, having a conical shaped nose, said hull being without sheer, and having a normally high load line, so that when in action the nose of the vessel will be near the water; a hinged plate, over the nose of the boat, adapted to normally cover the same; an inclined track or tracks

*Under this heading we will publish specifications accompanying letters patent granted to Alexander McDougall since his first application for a patent on the whaleback type of vessel, May 1, 1880.

within said hull, extending from said nose above the water line, down into the hold of the vessel to a point below the water line; and one or more guns movably mounted up the same, so as to point the muzzle of said gun, out of the nose, substantially as set forth. Third—The means of handling and firing guns on ships, provided with an open nose, which consists of an inclined track or tracks extending from said nose above the water line, down into the hold to a point below the water line, adjacent to the powder and shot magazines; and one or more guns, movably mounted on said track or tracks, substantially as set forth."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on June 24, 1893:

	Wheat, bu.	Corn, bu.
Chicago	19,497,000	1,687,000
Duluth	7,740,000	.....
Milwaukee	1,485,000	9,000
Detroit	1,183,000	8,000
Toledo	2,147,000	230,000
Buffalo	1,676,000	487,000
Total	33,728,000	2,431,000

At the points named there is a net decrease for the week of 2,027,000 bushels of wheat and 106,000 bushels of corn.

Electric Plant of the Cruiser Machias.

The cruiser Machias, recently tested by the United States naval board with such excellent results regarding speed is equipped with an incandescent lighting plant furnished by the Fisher Electric Company of Detroit, Mich. The generating apparatus consists of two twin direct connected engines and dynamos. The incandescent lamps are all enclosed in water-tight globes. But two sizes of wires were used in wiring this cruiser; one size for the mains or feeders and one size for the branches. Each lamp is taken from the feeder or main by means of a junction box and is controlled by a water-tight switch and receptacle, located adjacent to the fixture. This system of wiring represents the very latest method in marine incandescent lighting, and while it is very much more expensive than the usual method, it is absolutely safe. All the safety devices are enclosed in water-tight bronze boxes and the fuses are placed in glass tubes and applied without the use of screw-heads, and it is, therefore, a very easy matter to renew the fuse. The cruiser is also equipped with a 30 c. m. Mangin search lamp supplied with diverging lenses. The Fisher Electric Company's apparatus successfully passed the preliminary test and final inspection test of the naval board.

Decline in Canadian Shipping.

Since 1880 the average yearly decrease in the tonnage registered in the Dominion of Canada has been about 25,000 tons. Shipbuilding has, of course, deceased accordingly. The decrease was more noticeable last year than in previous years. In the List of Canadian Shipping, issued by the department of marine, William Smith, deputy minister says: "The total number of vessels on the register books of the dominion on Dec. 31, 1892, including old and new vessels, sailing vessels steamers and barges, was 4,007, measuring 964,129 tons, register tonnage, being a decrease of eight vessels and a decrease of 41,346 tons register, as compared with 1891. The number of steamers on the registry books on the same date was 1,502, with a gross tonnage of 234,711 tons. Assuming the average value to be $30 per ton, the value of the registered tonnage of Canada, on Dec. 31 last, would be $28,923,870. The number of new vessels built and registered in the dominion during the last year was 255, measuring 28,773 tons, register tonnage. Estimating the value of the new tonnage at $45 per ton, gives a total value of $1,294,785 for new vessels."

The following tables show tonnage owned in all parts of the dominion on Dec. 31, 1892, and the tonnage built and registered during the year ending with the same date:

MERCHANT VESSELS BUILT AND REGISTERED IN THE DOMINION OF CANADA DURING THE YEAR ENDING DEC. 31, 1892.

Province.	Number of sailing ships and steamers.	Number of steamers.	Gross tonnage of steamers.	Net tonnage of sailing ships and steamers.
New Brunswick	21	4	162	1,873
Nova Scotia	105	7	321	16,446
Quebec	34	11	389	2,620
Ontario	34	31	4,662	3,684
Prince Edward Island	9	4	95	967
British Columbia	46	17	1,937	2,887
Manitoba	6	4	384	296
Total	255	78	7,950	28,773

MERCHANT VESSELS OF ALL KINDS OWNED IN THE DOMINION ON DEC. 31, 1892.

Province.	Number of sailing ships and steamers.	Number of steamers.	Gross tonnage of steamers.	Net tonnage of sailing ships and steamers.
New Brunswick	946	101	8,950	181,779
Novia Scotia	2,731	123	18,743	425,690
Quebec	1,408	275	75,884	162,638
Ontario	1,347	755	96,497	141,750
Prince Edward Island	196	21	4,896	22,706
British Columbia	298	173	23,607	23,448
Manitoba	81	54	6,134	6,118
Total	7,007	1,502	234,711	964,129

As showing the decline in shipping and ship building the following table, covering twenty years, will prove interesting:

Comparative statement of vessels owned in the dominion on Dec. 31 of each year since 1873.

Year.	Number.	Tons.
1892	7,007	964,129
1891	7,015	1,005,475
1890	6,991	1,024,974
1889	7,153	1,040,481
1888	7,142	1,089,642
1887	7,178	1,130,247
1886	7,294	1,217,766
1885	7,315	1,231,856
1884	7,254	1,253,747
1883	7,374	1,276,440
1882	7,312	1,260,777
1881	7,394	1,310,896
1880	7,377	1,311,218
1879	7,471	1,332,094
1878	7,469	1,333,015
1877	7,362	1,310,468
1876	7,192	1,260,893
1875	6,952	1,205,565
1874	6,930	1,158,363
1773	6,783	1,073,718

Comparative statement of vessels built and registered in the dominion during each year since 1873.

Year.	Number.	Tons.
1892	255	28,773
1891	312	52,145
1890	285	52,378
1889	280	34,346
1888	264	25,130
1887	224	22,516
1886	229	32,207
1885	240	43,179
1884	387	72,411
1883	374	74,090
1882	289	61,142
1881	336	74,060
1880	271	65,441
1879	265	74,227
1878	340	101,536
1877	432	120,928
1876	420	130,901
1875	480	151,012
1874	496	180,756
.....	.....	.....

Advocating Winter Navigation.

EDITOR MARINE REVIEW: Why can we not keep our lake channels open for navigation throughout the winter, as well as the railways keep open their thousands of miles of track? This is a question that does not seem to receive the attention that it demands. Expenses attending the laying up and fitting out of vessels would go a great way towards the cost of keeping channels open. Wooden boats could not engage in this winter service, but the big iron boats would probably be at little disadvantage on account of ice forming about them, as this could be prevented by heating their water ballast with steam. Channels through 300 miles of connecting waters could be kept open by ice breaking boats fitted to carry and care for a large force of men, and located at such points as the St. Clair river, Straits of Mackinac and St. Mary's river. This cost would be light as compared with the cost of keeping open 1,000 miles of railway, for which fully 1,000 men are required. Even five boats daily of 100,000 bushels capacity each, would be equal to seventy-five trains of ten cars each. Then, too, there would be the advantage of increased rates of freight during the winter months. I am a Canadian, but I admire your system of steam-boating on the lakes. Is not this subject worthy of attention from some of your ship owners.

Sudbury, Ont. T. M. KIRKWOOD.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

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LAKE vessel owners were not surprised by the announcement that Col. Elliott of the engineer corps, U. S. A., had resigned his position on the light-house board out of plain disgust with the service. There is no longer any secrecy about the causes leading up to the resignation of this eminent officer. The treatment accorded Col. William Ludlow in the St. Mary's river lighting matter was the final cause for Col. Elliott's action of a few days ago, but it is evident that he has for some time past had little regard for the service rendered by the present board to the important interests entrusted to its care. Vessel owners on the lakes are also growing tired of the disregard of matters of vital importance to them by the executive officers of the board, whose actions are prompted by Prof. Mendenhall and other members, having no actual knowledge of the needs of commerce in this part of the country. Only a few days ago the Lake Carriers' Association was forced to delegate two of its members to visit Washington, in order to try to avert the danger of having lights discontinued at the Lime-Kilns crossing, because the engineer secretary of the board, Capt. Mahan, took it into his head to again raise an international question, by applying to Canada for permission to place two little float lights on the American side of a channel constructed by the United States government at an immense cost, but neglected by the light-house board for about two years after its completion, on account of the whims and petty notions of the executive members of the board. Numerous other instances of neglect and delay in establishing lights, fog signals, etc., at points where the work of completing the structures for such aids to navigation had been done promptly might be cited here, but vessel owners have given up calling attention to such matters. This board as at present constituted it is not only an obstacle in the way of lake shipping securing proper recognition in appropriations for aids to navigation,but a source of continual annoyance in its methods of dispensing the appropriations. The Lake Carriers' Association should demand the removal of both Prof. Mendenhall and Capt. Mahan, who have shown, in the light-house service, direct antagonism to everything pertaining to the advancement of lake commerce.

BOTH the American Steel Barge Company and S. F. Hodge & Co. of Detroit, builders of hull and machinery of the world's fair steamer Christopher Columbus, have reason to feel proud of the speed of the vessel, but there is nothing to be gained by the story that has gone the rounds of lake newspapers crediting the Columbus with a speed of nearly 23 miles an hour on a recent trip between Milwaukee and Chicago, and it should be contradicted by a correct statement of the time from the owners. As near as can be learned the run was not made under favorable circumstances but the time was somewhat better than 18 miles an hour. Even this is sufficient to justify the owners of the boat in claiming that she will surpass in speed any steamer on the lakes, but no one who has a knowledge of the power required to maintain a speed of 23 miles an hour will believe that it can be done with any machinery now in service on the lakes. At 155 pounds steam and 108 revolutions the engines of the Columbus are credited with 2,637 horse power, and there is every reason to expect that with 170 pounds of steam, her limit of pressure, she will develop 3,000 horse power. This would make her engines the most powerful on the lakes by long odds and undoubtedly insure a marked increase in speed, but hardly to 23 miles an hour.

CINCINNATI wants a canal in order to secure water communication with Lake Erie, and the chamber of commerce is trying to enlist for the scheme the support of all towns along the proposed line to Toledo. The effort must fail. Ship canals connecting long stretches of water haul will enlist government and private financial support, but, with the great strides in railway development, the days of canals that will admit of only boats of small dimensions have passed.

Two Prominent Lake Men.

J. Tallman Whiting who died suddenly at Detroit on Thursday last in his seventy-sixth year, was amomg the veteran vessel owners of the lakes. He was general agent of the Western Transit Company at Detroit, and his connection with Lake Superior commerce, which continued up to the time of his death, extended back to its beginning. Mr. Whiting owned some of the first vessels engaged in the Lake Superior trade. In writing for the treasury department, about a year ago, a history of early navigation on Lake Superior, Mr. C. H. Keep, secretary of the Lake Carriers' Association, relied almost entirely upon assistance in the work from Mr.Whiting, who was probably better qualified than any living person to give an account of commerce before and after the building of the first lock. This short bit of history, which was reprinted in the REVIEW at the time, contains extended reference to Mr. Whiting's early life. A meeting of vesselmen held in Detroit to take action expressive of their esteem for the deceased was very largely attended,and a committee appointed to draw up resolutions expressive of the sense of the meeting prepared the following tribute, which has been suitably engrossed:

"God in His wisdom, having removed from our midst our highly esteemed fellow citizen and dearly beloved business associate, J. Talman Whiting, the following tribute to his memory was unanimously agreed upon at a public meeting of the representatives of the vessel interests in the City of Detroit, this 24th day of June, 1893, duly assembled to express their sense of public and personal loss in his death. Born and eduacated in the little hamlet that has grown to be the city of our pride, he was first identified with the vessel interests of Lake Michigan, and later with the same interests at Sault Ste. Marie, returning to the place of his birth in the early days of the year 1857, from which time he has been the foremost figure of the business which we represent, and of which it may be said he is the pioneer. As a business man he entertained the most liberal and broadest views of the requirements of the interests with which he was always identified. He was a hard and indefatigable worker and has won our praise and esteem by his untiring energy and efforts in instituting and promoting all the improvements along the chain of great lakes, and aiding in bringing the business of transportation by water to its present degree of efficiency and perfection. Entertaining and observing throughout his long career the strictest views as to truth, integrity andhonor, he has ever been an example to his fellowmen, whose many virtues we should ever strive to emulate. In his death we feel that we have lost an honored and safe adviser and a beloved friend, whose name and memory will long be retained in the business circle and city in which he was so prominent. With sorrowing hearts and profound appreciation of their great loss, we tender our sincerest sympathy to his family in their great affliction, and in the sudden termination of a long and honorable career; and as a fitting token of our appreciation of the great calamity that has befallen the community in which he lived, the secretary of the meeting is instructed to prepare and transmit a copy hereof to the family of the deceased."

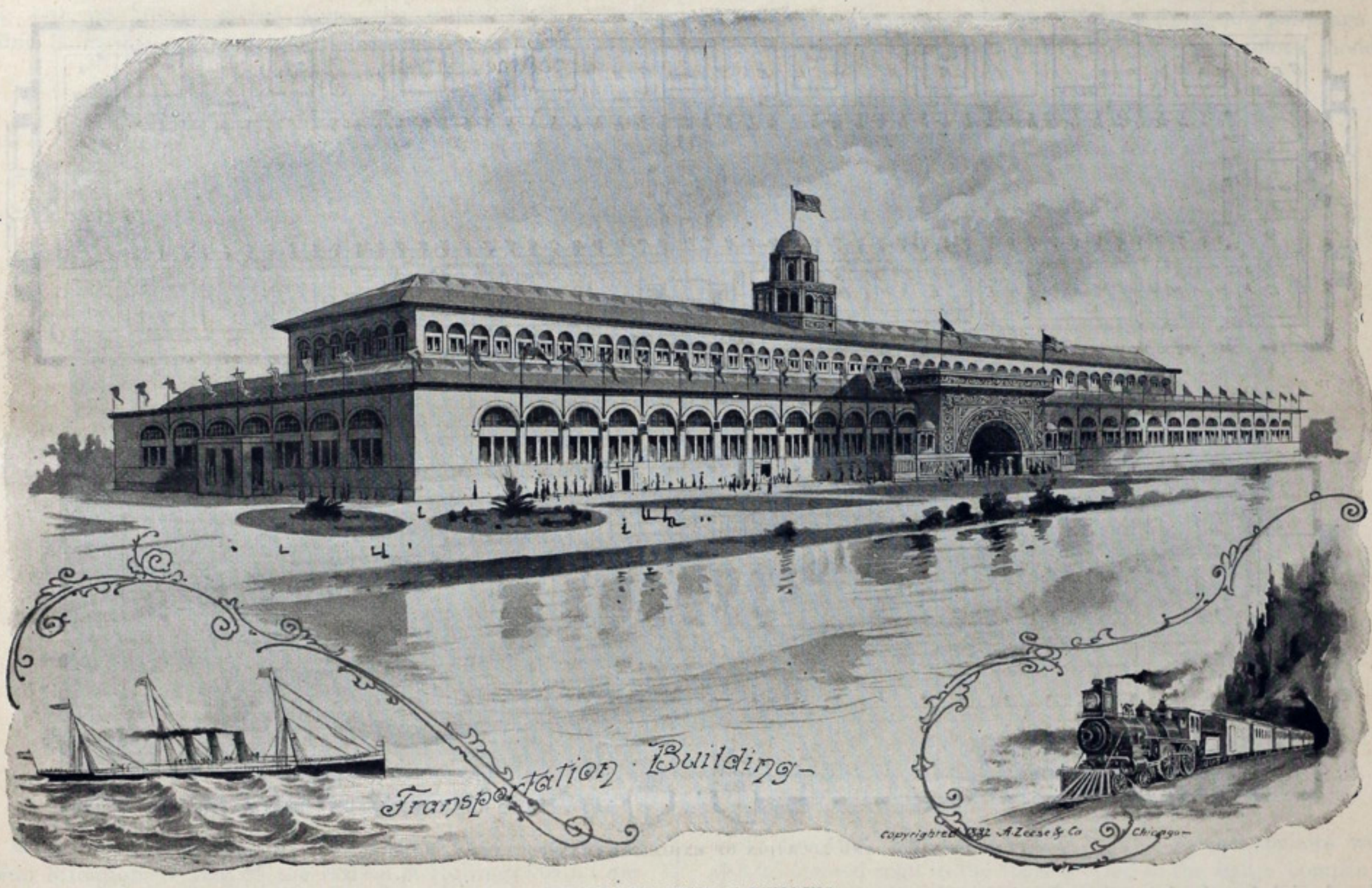
Capt. Eber was chairman of the meeting and W. A. Livingstone secretary. Members of the committee are George N. Brady, O. M. Poe, W. H. Stevens, E. M. Peck, S. B. Grummond, A. A. Parker and Robert T. Gray.

William H. Quayle, who died at his home on Euclid avenue, Cleveland, Sunday, was a member of the firm of Thomas Quayle's Sons, ship builders who operated in Cleveland, up to a few years ago, one of the largest wooden ship yards on the lakes. The other members of the firm were George L. Quayle and Thomas E. Quayle, the former gentleman being still engaged in the ship building industry as superintendent of the Ship Owners' dry dock, Cleveland. Mr. Thomas Quayle the elder, who is probably the oldest ship builder on the lakes, is still enjoying fair health, although he had given up business to his sons several years before wooden vessels had begun to be displaced by the modern steel boats.

WORLD'S COLUMBIAN EXPOSITION.

Features of Direct Interest to the Shipping Trade—Leading Foreign and Home Exhibits—Displays from Representative Concerns on the Lakes—Historic Relics and Curiosities.

No one actively engaged in marine affairs can afford to miss seeing the exhibit of means for water transportation at the World's Columbian Exposition, Chicago. It may not be as complete as the electrical exhibit, nor cover as much space as the land transportation exhibits, but even to the visitor who is not directly interested, it is more attractive and instructive. On the corners of the "golden door", the most beautiful entrance to any building in the "white city", are quoted the words of two master minds: "There be three things which make a nation great and prosperous—a fertile soil, busy work shops and easy conveyance for men and goods from place to place."—Bacon. On the opposite corner are the words of Macaulay: "Of all inventions, the alphabet and printing press alone excepted, those inventions which abridge distance have done most for civilization." When it is considered that water transportation is comparatively much cheaper than rail, the average charge, for instance, for carrying a bushel of corn from Chicago to Buffalo last year being 1.9 cents, it is seen that water transportation comes in for a large share of the importance attached to commerce. In fact, had it not been for the commerce of the great lakes, the great exposition would not have been pitched so far inland, as Chicago would never have been the great center of western commerce that it is today if it were not for the development of lake navigation. With the present growth of this western metropolis, the importance of the lake business is dwarfed by other great industries, but Chicago river has at all times been an important factor in the city's progress. The relations of lake commerce to the fair are not, however, confined alone to the advancement of Chicago as a lake city. The magnificent mining exhibits from Michigan and Minnesota, and great displays from the iron furnaces, mills and coal mines of Ohio and Pennsylvania represent indirectly the advantages of cheap water transportation. Without the lakes as a means of cheap transportation, the ore business of Lake Superior, now involving an investment of $175,314,785 in mines, railways, docks and vessels, could never have been developed. Cheap ore and cheap fuel could not have been united in Pennsylvania and Ohio but for low rates on water-borne freight. Therefore, in addition to the convenience, it was quite fitting that the great exposition should be located on the shore of Lake Michigan, from the waters of which the finest view is obtained of the white buildings that cover 600 acres, the manufactures building covering so much ground that by walking around it and across the end one traverses a mile. In addition to visiting the transportation building the naval architect or engineer, and, in fact, any one interested in marine affairs, will find much to attract attention on the war ship Illinois, in the Krupp building, the manufactures building, machinery hall, the electricity building and the White Star line building. He will certainly inspect the electric launches, which represent the first successful attempt to carry passengers on water by electricity. The gondolas may interest him, and when the Columbus fleet and the viking ship arrives the marine exhibit will receive more general attention. No exhibit, however, will attract as much attention as the whaleback passenger steamer, illustrated in the REVIEW on June 1. The bow and stern terminating in skeags and the cabins on top of the turrets are so striking that every eye is attracted whenever she puts in an appearance. In speed and in carrying capacity, having room for 5,000 excursion passengers, she is a notable boat. There is still another feature that has been added to marine exhibit lately. It is the electrically lighted buoys, on the twelve-mile course from Chicago to the fair grounds. They were fully described in the June 15 issue, and will no doubt be



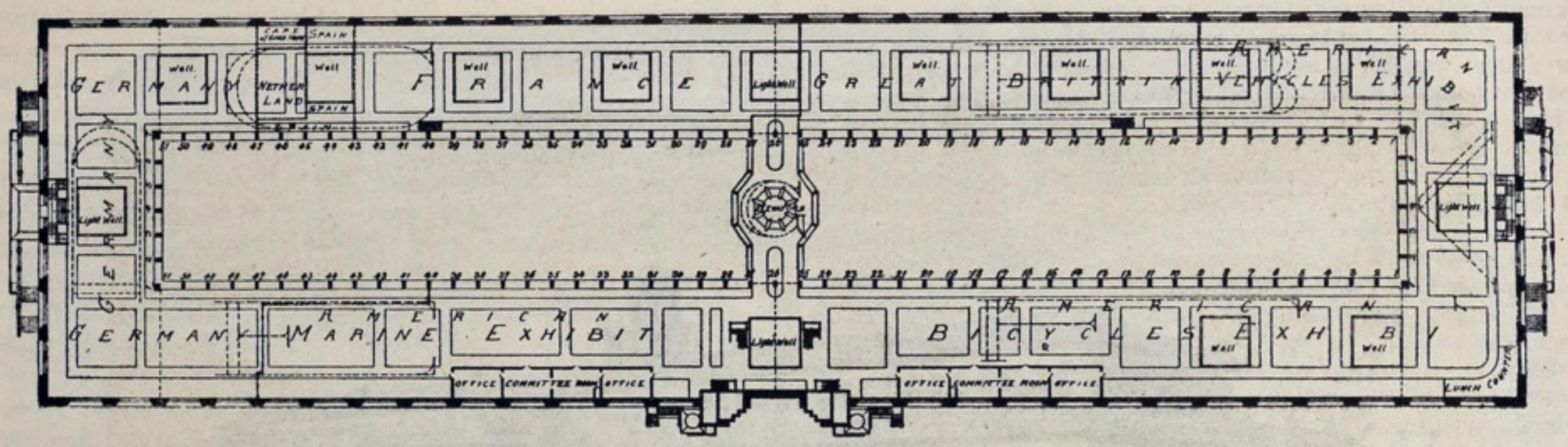
THE TRANSPORTATION BUILDING.

examined by everyone interested in aids to navigation. This route to the fair is probably the best lighted channel in the world. On illumination nights a trip along this channel and a walk through the court of honor, with the search lights playing on MacMonnie's fountain, and thousands of incandescent lamps gleaming from every niche of the great white buildings, the flaming torches on the administration building, will make up a picture of light that will never fade. Even commerce is represented in the great fountain by six young men on sea horses.

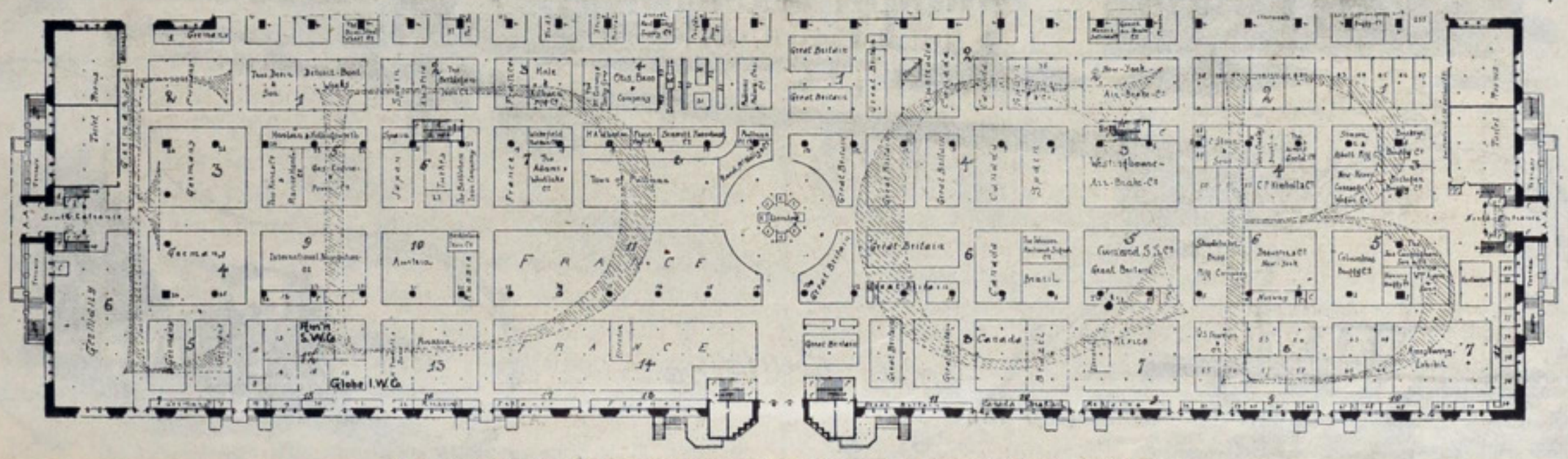
THE TRANSPORTATION BUILDING.

After all, men who live on the water, or who make money from ships that go by either steam or wind, will want to see the marine exhibit proper, which is located in the transportation building. There is no trouble in finding it. It looks as if the decorators had exhausted the supply of white-wash when they came to the transportation building, and had bought some dull red and a job lot of other colors for this eeifice, but it would seem as though the building should have been white like all the other buildings. The main building is 960 feet front by 256 feet deep, an annex for railway exhibits extending back about 600 feet from the rear. There is nothing of particular interest in the annex to the marine man. The "golden door" is no doubt the most elaborate and costly entrance ever constructed in connection with an exhibition building, and it is well worthy of an examination before entering. It is covered in leaf shaded from gold to silver, and the plaster cast relief in the panels at the sides of the entrance are works of art showing the earliest modes of transportation.

Willard Smith is chief of the department of transportation, but Lieut. C. W. Baker has been detailed for the marine division. Ship builders or owners calling on Mr. Baker for special information will find him very obliging. His office is at the head of the stairway near the "golden door" entrance. The four great marine exhibits in the building are: The full sized section from the International steamer building at Wm. Cramp & Sons yard, Philadelphia; the 125-ton steam hammer, made by the Bethlehem Iron Works, the greatest in the world; the 30-foot model of the unfortunate British ship Victoria, exhibited by Armstrong, Mitchell & Co., with a general exhibit of models by this same company, and a 40-foot painting by the Harlan & Hollingsworth Company, Wilmington, Del. The weight of the striking parts of the Bethlehem company's hammer is 125 tons, five tons heavier than the great Krupp hammer. It has a full stroke of 16 feet and the piston is 40 feet long. It stands about 70 feet high, the striking space forming an archway over the main aisle of the building. The reason it is placed in the transportation exhibit is that it is used to forge armor plate, shafting for steel steamers, coast defense guns and war-ship armament. Another piece of forging in the exhibit of this company is a spare shaft for the Puritan, which is 39.5 feet long and 27 inches in diameter, with a 9-inch hole in the center. The weight of this shaft is 65,900 pounds, while an ingot in the exhibit weighs 108,190 pounds. It is 54 inches diameter and 15 feet long. The finish on this shafting is much finer than that of the English work. One of the thirteen plates for the Indiana's steel barbette is also shown. It is 12 feet by 9 feet and is 17 inches thick, weighing nearly thirty-five tons.



PLAN OF GALLERY—TRANSPORTATION BUILDING.



PLAN OF FLOOR AND LOCATION OF EXHIBITS—TRANSPORTATION BUILDING.

The section of the International company's steamer is from the port side, amidships, including the middle funnel. It is 70 feet long, 35 feet wide, and is equal to about one sixteenth of the whole steamer. No machinery is shown, but the fittings of the different classes of passenger accommodations is interesting. The section may be entered from either end, the floor of the building representing the water line. There is found the steerage with comfortable bunks and blankets, and the young man who has been thinking of going it steerage just for fun will be encouraged. Next is the main deck with several state-rooms, and some second-class rooms. On the next deck is the dining room. The pannels in the hall are gold stucco work, rich but plain, and the same hallway leads to the lower promenade deck. The ceiling of the dining room is in silver frame and green

panels. A library is found on the promenade deck. Many are the suggestions for tasteful decoration of passenger boats to be found in this exhibit, which is true to the smallest detail. After reaching the top of this section and entering the gallery of the transportation building, it is found that the stack is 28 feet above the cabins, so that one gets a good idea of the depth of an ocean steamer to the water line. The third in line of striking displays is the 30-foot model of H. M. S. Victoria. It is thought to be the most complete model in existence. It cost $7,500. Only half the vessel is shown, but it is placed againt an immense mirror, so that the other half is reflected and the ship as a whole is presented to view. The ship was built by Armstrong, Mitchell & Co. and is 360 feet long, 70 feet beam and 26 feet 9 inches deep, with displacement of 10,510 tons. Her engines are credited with the development of 14,244 horse power and her speed is put down at 17½ knots. Every detail is shown large enough to be appreciated. Water surrounding the ship is represented by glass, and at the edge of the glass is the torpedo netting hung out on booms guyed from the upper deck. This exhibit is in the center aisle of the buildlng near the elevators and it is worth looking up. The fourth exhibit attracting general attention is that of the Harlan & Hollingsworth Company. With the exception of a working model of the City of Worcester, a working model of triple expansion engines and models of the Richard Peck and New Hampshire, the exhibit is on an immense stretch of wall space surmounted by the largest oil painting at the fair, showing all the different classes of vessels built since the organization of the company in 1836. Interest will center in the model of the Richard Peck, the twin-screw steamer that ran 23 miles an hour in her famous race with the Puritan. Her two engines are 24, 38 and 60 by 30 inches, and she is 315 feet long, 48 feet beam and 18½ feet deep. She is not, however, the fastest steamer represented. This distinction is claimed for the iron side wheel steamer New York, a picture of which is accompanied with the statement that she is the fastest steamer in the United States. She has a record of 27½ miles an hour between Albany and New York, faster than the famous Mary Powell. And for size, this company presents a picture of the car-ferry Solano, which is in service in South America between Bemena point and Costa. She carries 48 freight cars or 24 passenger cars. She is 424 feet over all, 406 feet keel, 64 feet beam and 116 feet over paddles. Her two engines, with 5 by 11 feet cylinders, turn 30 foot paddles. The company has published a Semi-Centennial Memoir full of interesting facts about the 300 ships they have built and containing a history of navigation from its earliest days. Mr. Lednum is in charge of the exhibit and the striking arrangement of models and paintings is due to his judgment.

LAKE MARINE EXHIBITS.

It would hardly be expected that the display from the ship yards of the lakes would equal that of the coast yards, which were established when lake commerce was carried on in batteaux and long boats, but in the exhibit representative of the lakes there is a fair illustration of the wonderful strides that have been made in metal shipbuilding since this industry was begun about seven years ago. The American Steel Barge Company's three complete models, the Christopher Columbus, Colgate Hoyt and 102, represent the different types of whalebacks, passenger and freight steamers and tow barge. Two of Sprague's paintings of the Columbus, and photographs of the yard, with block models adorn the walls, and one of McDougall's patent anchors will also be located soon in the space alotted to the barge company. The greatest exhibit of machinery from any ship yard is made by the Globe Iron Works Company, and the arrangement is carried out very conspicuously by a representation of two decks of a steamer and the bridge. The steering engine is on the floor and the steering wheel on the deck above, as are also the capstans. The machinery is operated for the benefit of those who are interested. It is without doubt the finist finished machinery of its class in the exhibition. The complete model of the package freight steamer Tuscorora is the handsomest model of a lake steamer in the transportation building. A correct painting of one of the two Great Northern steamers is hung from the railing of the upper deck. This exhibit includes steam capstans, windlasses, steam steering engines and photographs of triple expansion engines. It is in charge of Capt. Joseph Church.

Although Providence is not on the lakes, the Providence windlasses are on more than half the vessels in the business fleet of the lakes and therefore a description of the exhibit of the Ameaican Ship Windlass Company is included here. One of this company's No. 6 steam capstan windlasses, of the same size and

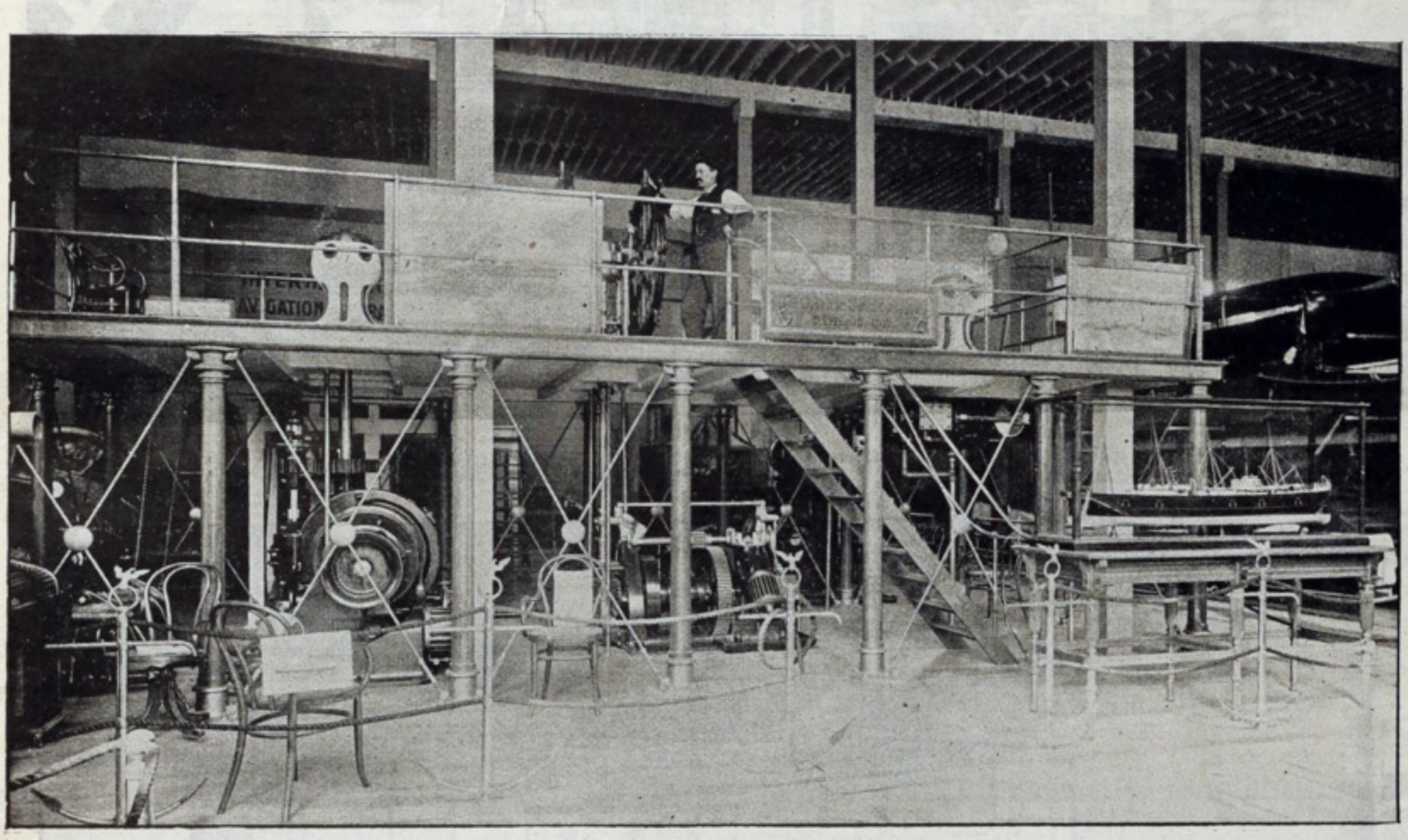


EXHIBIT OF THE GLOBE IRON WORKS COMPANY, CLEVELAND, O.

style as that furnished all the larger lake vessels, first takes attention. It is in operation most of the time, as is the steam towing machine, which is a counterpart of that fitted on the steamer Aurora. The practicability and usefulness of this machine was proven several years ago on the Boston Tow Boat Company's steam collier Orion. This exhibit also includes capstans of all sizes, a 00 geared crank capstan and a dock steam capstan. The case of nickel-plated models of all classes of

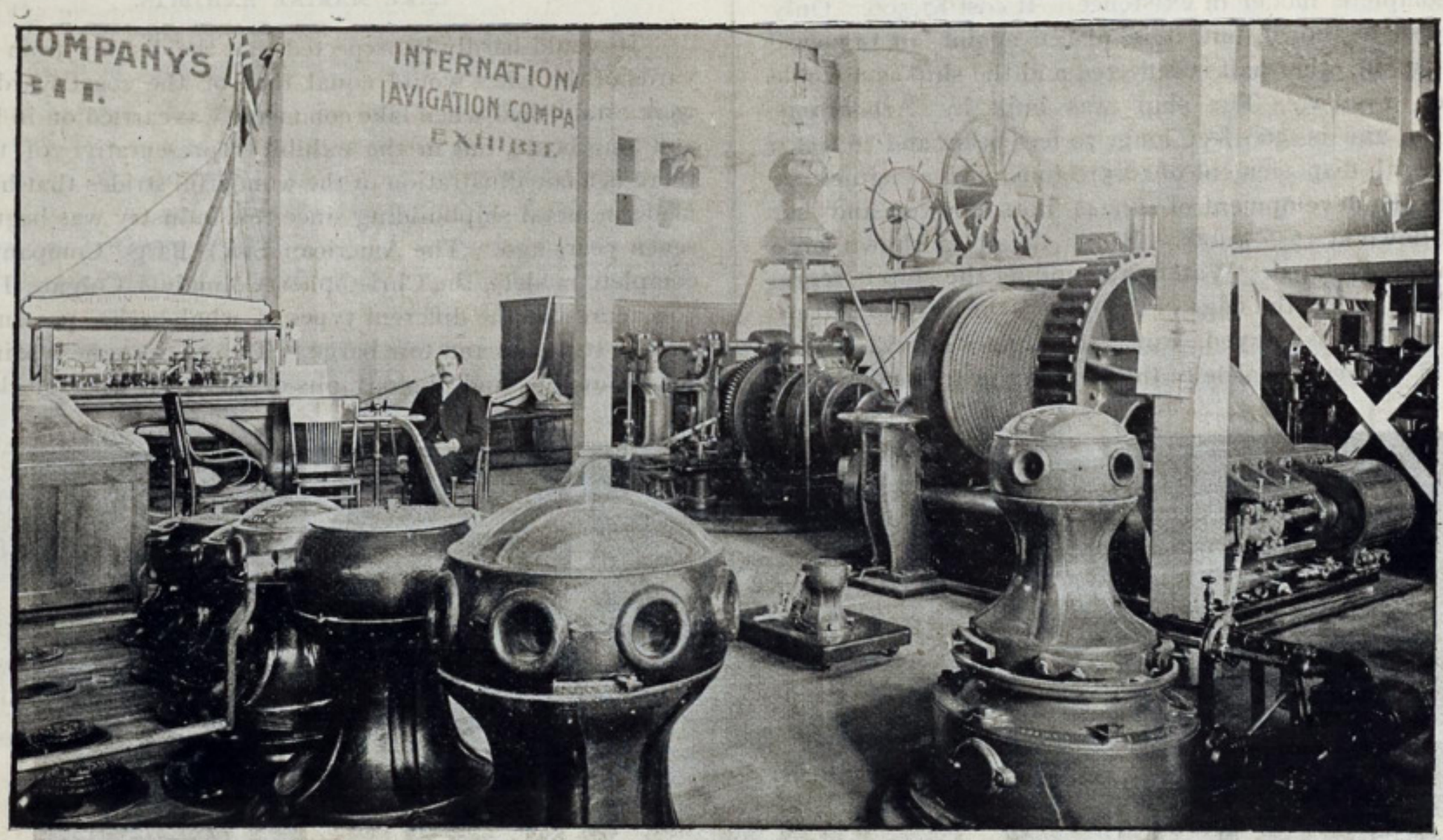


EXHIBIT OF THE AMERICAN SHIP WINDLASS CO, PROVIDENCE, R. I.

EXHIBIT OF AMERICAN STEEL BARGE CO., WEST SUPERIOR, WIS.

machinery of this kind is a handsome display in itself. In addition to this machinery in the transportation exhibit, there are two of the Providence naval capstans on the U. S. war ship Illinois. The Providence capstans are artistic as well as durable, for a plaster cast of a sailor in the liberal arts building shows him sitting on a Providence capstan. Mr. Fred Pell is in charge of this company's exhibit.

The Chicago Ship Building Company has an interesting wall exhibit in the gallery, consisting of a black and white painting of the passenger steamer Manitou, a model of the same steamer, and models of the Maritana and Arthur Orr. As the yard of this company is not far from the fair grounds, and as all plate and material is handled by a Brown traveling crane it would no doubt be worth the time spent to visit the yard. The only lake ship chandlery concern having an exhibit is Geo. B. Carpenter & Co., Chicago, Ill. It is a very complete collection of everything of importance in this line and it is tastefully arranged. McBean, Edge & Co., signal lamp manufacturers, Buffalo, N. Y., have included in this display a set of their well-known lamps finished in brass. Fluted and corrugated lenses with corrugations inside and out are shown. The Detroit Boat Works, Detroit, Mich., have an exhibit including all kinds of fine boats turned out by them, but they call attention particularly to the fact that the electrie launches running on the lagoons were constructed at their works, the one for Director Davis' private use being one of the finest pieces of marine archi-

tecture for pleasure purposes that is to be seen at the fair. C. F. Elmes, Chicago, Ill., in furnishing the engines for the steam yacht Chicago, secured a chance to exhibit his machinery, and Thos. Kane & Co., Chicago, Ill., and T. H. Truscott & Sons, St. Joseph, Mich., make very fine displays of pleasure boats, from livery boats to steam launches.

COAST AND GENERAL EXHIBITS.

The most striking exhibit from any coast yard is that of the Union Iron Works, San Francisco, occupying an entire section in the gallery. A model of the entire plant of this company at Protrero is well executed. The machine shops, ship sheds and all the buildings and offices are shown as well as the ways and other details of the plant. Several vessels are on the stocks, and off in the water lay three models of war-ships built at this western yard. The topography of the heights is shown and it is quite realistic and interesting. A similar but smaller exhibit is shown by the Newport News Ship Building and Dry Dock Company. The buildings are well represented and one of the great

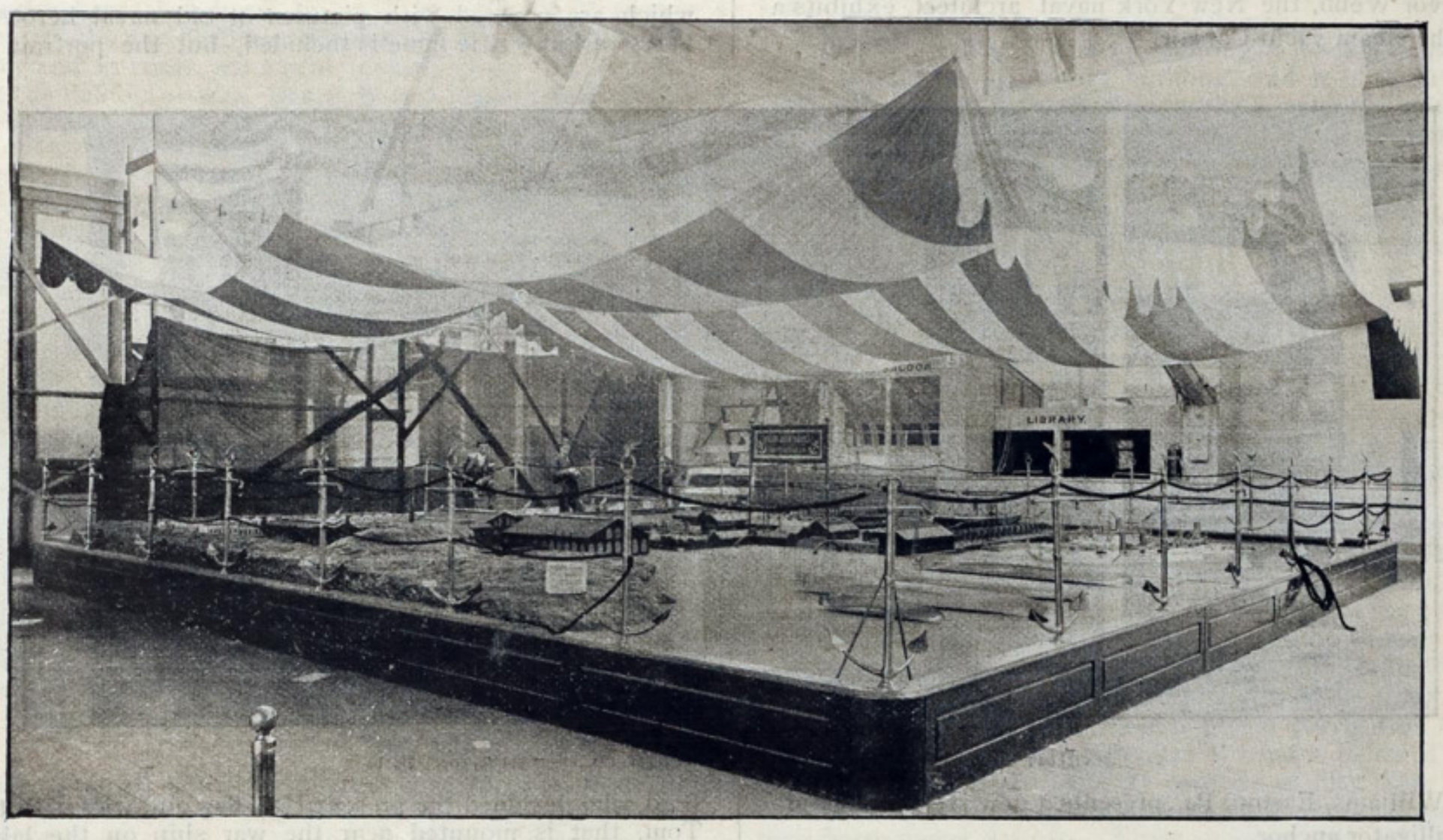


EXHIBIT OF THE UNION IRON WORKS, SAN FRANCISCO, CAL.

Morgan line steamers is shown on the stocks. The relative size of the immense dry dock is presented to advantage, and at one end of this miniature representation of the plant, which is the best laid out and best equipped plant of its size in the world, is a 20-foot model, complete, of the El. Sud. The reason for the excellent arrangement of the yard was that it did not grow from time to time, but millionaire C. P. Huntington ordered the plant as a ship is usually ordered. It occupies 75 acres, has a water frontage of a half mile and the buildings cover six acres. There are eight ship ways from 400 to 500 feet long. The dry dock is one of the finest in the country. It is 600 feet long, 130 feet wide on top, 50 feet wide at bottom, having a 93-foot gate and a depth of 25 feet, yet only one and one-half hours are required for pumping it out. The Maryland Steel Company, Sparrow's Point, Md., is catalogued in the gallery E-41, as showing models of ships, ships' appliances, photographs and marine fireworks. Maine ship building is well represented by exhibits of models by Morse & Co., the New England Company of Bath, C. V. Minott of Phippsburg, and the Bath Iron Works, the latter company exhibiting nothing but their windlasses. There is, however, a model of the Katahdin in the model room of the war ships. The absence of exhibits from the Delaware River Iron Ship Building and Engine Works, W. & A. Stevens, the Morgan Iron Works and the Wm. Cramp & Sons Ship and Engine Building Company is very noticeable, although the Cramps are well represented by the section of the International steamer building by them and the model of the New York and several other war vessels. If the fair had gone to New York something notable would probably have been done by these concerns.

The naptha launches—"the only naptha launch"—Santa Maria, Pinta and Nina, Isabella and Ferdinand, attract attention not only on account of their names, but also in view of their elegant furnishings, and the Gas Engine and Power Company makes as good a display as a whole as any pleasure boat concern in the building. Thos. Drein & Son, Wilmington, Del., have the largest display of life-saving appliances and boat equipments. It is well arranged.

The Providence and Stonington line exhibit a model of the Maine, their latest and handsomest boat, the John Richmond, built in 1838 and famous as a racer in the early days of sound navigation and the Fulton built in 1814. The loss of the Lexington on Long Island sound in 1840 is history, but David Crowley, one of two survivors, is in charge of the exhibit and willing to tell how he floated on an ice-coated bale of cotton for forty-eight hours.

The New York and Sandy Hook Pilots Association is the only marine organization that took the trouble to enlighten people as to their work. The association's display is interesting. In addition to the model of a pilot boat, there are a number of paintings, among which is the Ambrose Snow in a hurricane, the Phantom taking passengers from the Oregon and the New York getting a pilot during a gale.

D. Kahnweiler & Co., New York, the Chase Elevator and Maniton Windlass Company, and the Sintz Gas Engine Company of Grand Rapids, Mich., have also prepared exhibits that add interest to the marine department.

An immense map of the water-ways system from Duluth to New York, showing the great lakes and Erie canal, together with photographs and a model of a lock, is the New York state canal department's contribution.

The exhibit of steering engines by Williamson Bros.,

Philadelphia, whose engines are also on the war ship Illinois, is in the same section as all of that class of machinery.

J. H. Rushton, Canton, N. Y., illustrates the lightness of his canoes by showing one on the head of a figure of a boy, who does not look a bit tired.

The Boston & Lockport Block Company have an extensive display of blocks, wood and iron, from the smallest to the largest manufactured.

De Grauw, Aymar & Co., South-st , New York,show a rack full of oars which they manufacture at Toledo, O., and Montpelier, O.

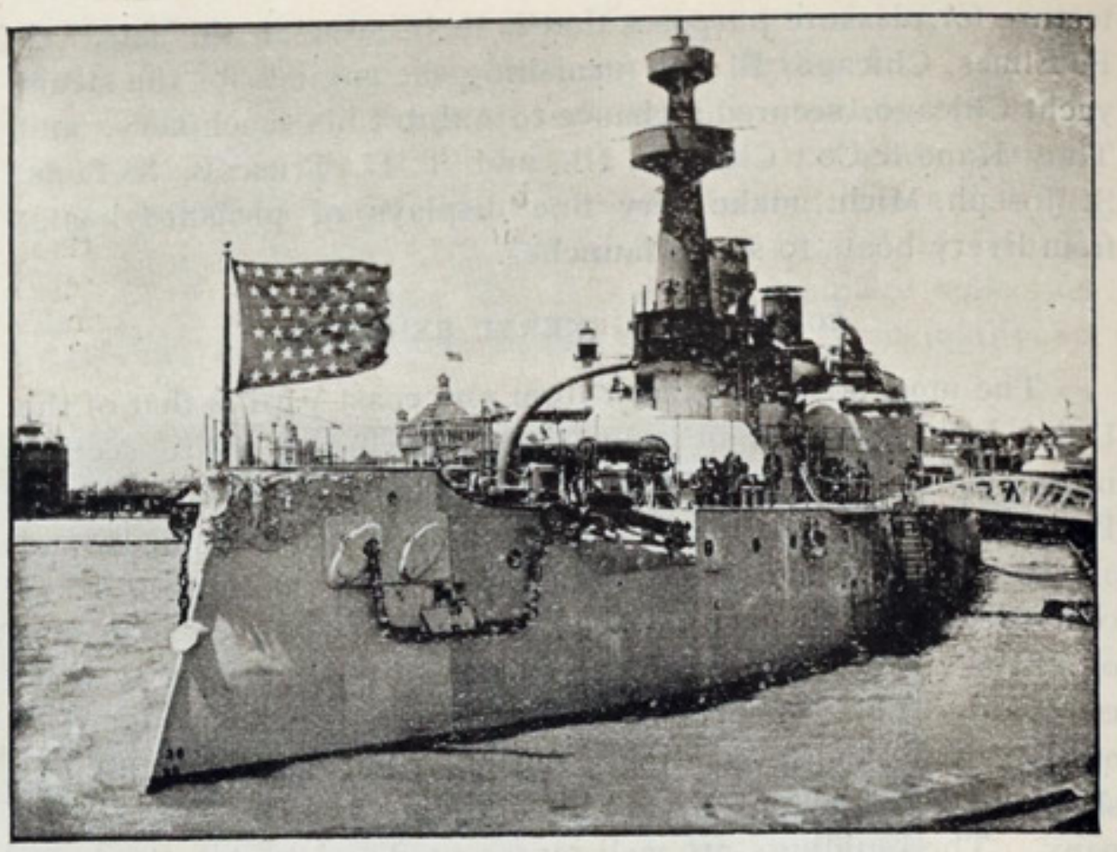
The Americam Publishing Company, Hartford, Conn., show a number of large water colors of our new navy by Cozzens.

Some very neat bales of oakum make up the exhibit of the Geo. Stratford Oakum Company, Jersey City, N. J.

Laughlin & Co., Portland, Me., present light anchors, steering wheels and other steering apparatus.

Stewart & Binney, leading yacht designers of Boston, have wall space well filled with models.

J. Beavor Webb, the New York naval architect, exhibits a model of the steam yacht Corsair.



U. S. NAVAL EXHIBIT, BATTLE-SHIP ILLINOIS.

C. K. Williams, Easton, Pa., presents a new style of anchor, called the alligator anchor.

A good collection of boats and oars is marked B. N. Morris Veazie, Me.

THE UNITED STATES WAR SHIP.

The most distinctive and exclusively marine exhibit is shown in the United States war ship Illinois, which is a duplicate in every particular, with the exception of having no machinery and being built of brick, upon a sub-structure of piling, of the Indiana and Massachusetts, 348 feet long, 69 feet 3 inches beam, with 12 feet of free board, recently built by the Wm. Cramp & Sons Ship and Engine Building Company for the United States government at a cost of about $3,000,000. None of the United States war ships could get through the St. Lawrence canals, and it was thought that the navy should have some kind of representation at the great exposition, so this was the means taken to obtain it. To every one except a marine engineer the imitation is very satisfactory. On going aboard, one of the first things noticed is the immense anchor chains with the imprint B. N. Y. on them, which signifies that the United States makes its own chain at the Brooklyn navy yard. After looking through the United States Naval Academy exhibit, showing the different text-books which the middies have to master, there is a good deal of sympathy expressed for them, and naval officers rise correspondingly in the estimation of the visitor.

There is in this exhibit knots of every description used in the navy. On the lower deck aft there is a room, the walls of which are covered with pictures ot old naval heroes. Com. Perry of Lake Erie fame is included, but the portrait of Capt. Reid, who designed the present U. S. flag and who with the Long Tom, that is mounted near the war ship on the lake front, defended his ship Gen. Armstrong in the harbor of Fayal in the Azores against a British fleet mounting 163 guns, on Sept. 26, 1814, will be admired as much or more than any of the others.

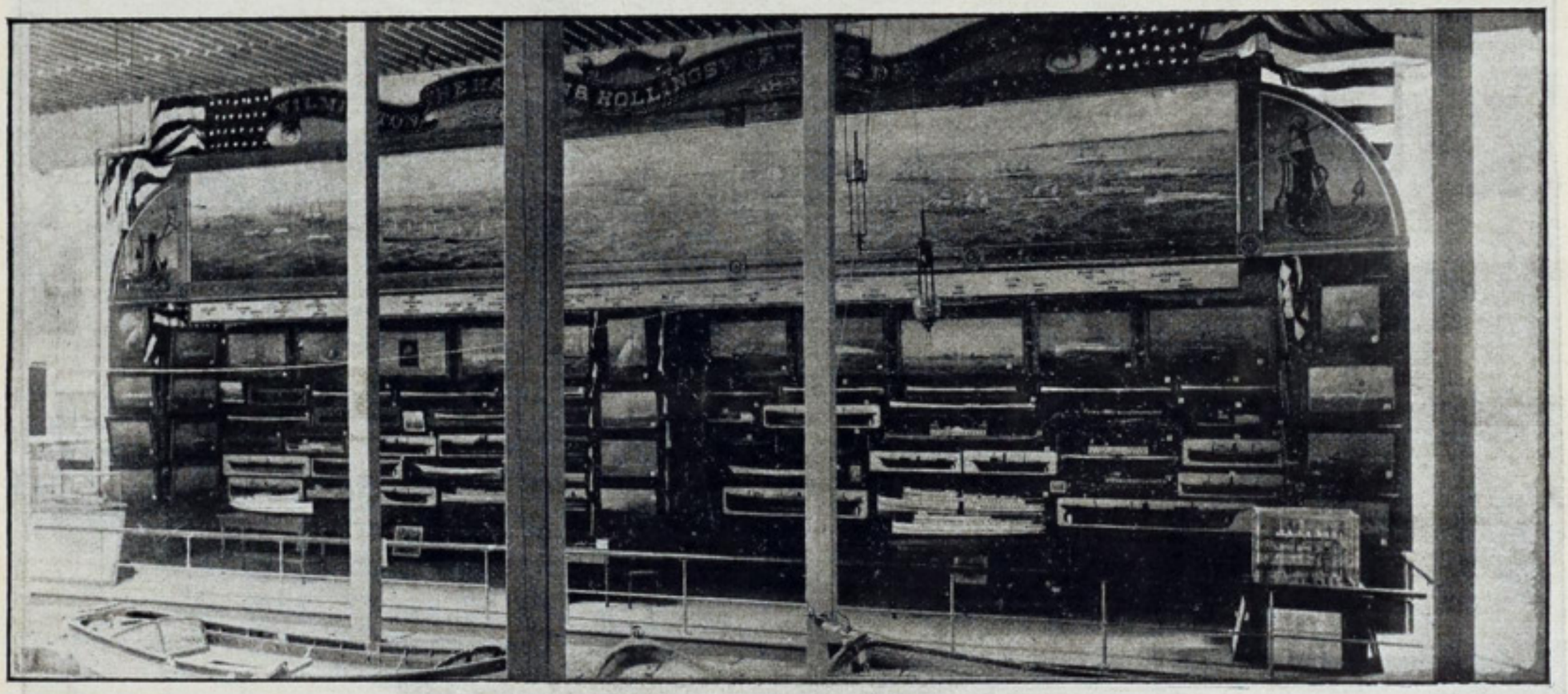


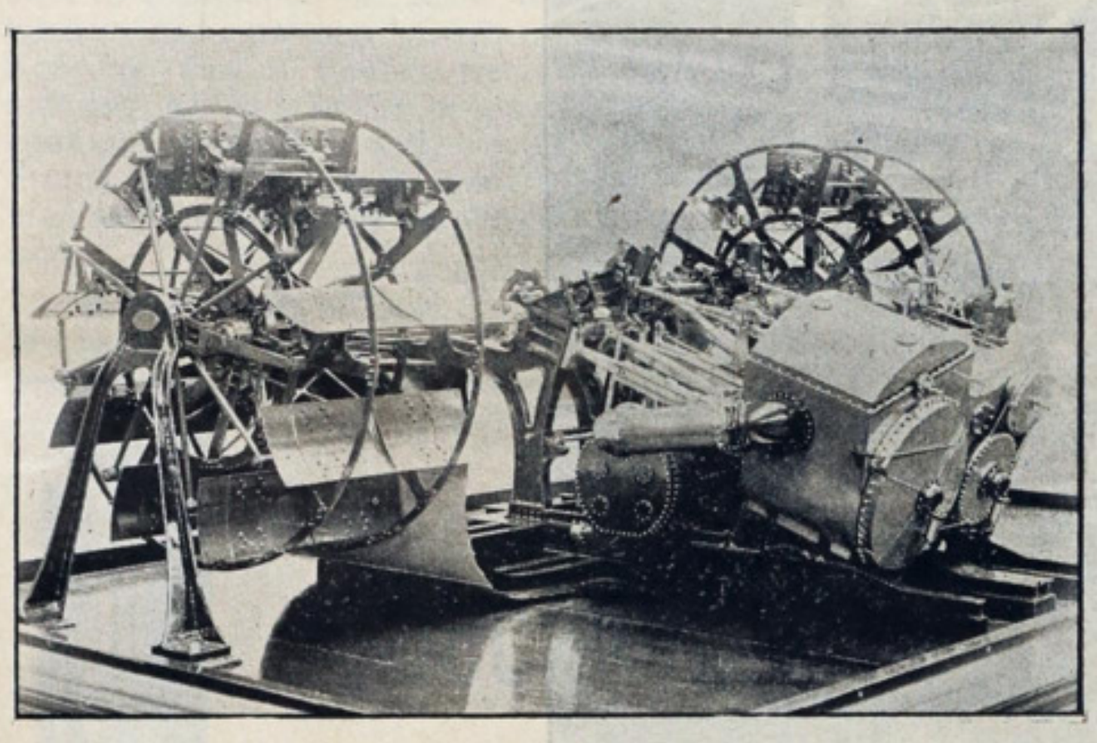
EXHIBIT OF THE HARLAN & HOLLINGSWORTH CO., WILMINGTON, DEL.

A very good idea of how Uncle Sam's sailors sleep and eat can be had by going through the ward and mess room where several hammocks are strung, some tied up and some ready for action. Several of the mess tables are swung from the ceiling, and a locker containing dishes for one mess is noticeable. Up on deck two big flat-headed Providence naval capstans, one forward and one aft, are kept shining by the crew of the U. S. S. Michigan, which is detailed to the Illinois every day. In the same room where the portraits are hung is shown a piece of 4-inch armor plate which has been shot through a number of times, and on top of the plate stands a projectile that has been fired through the plate twice without even denting the pointed head. The ammunition hoists which lead from the turrets down to the shell room and powder magazine are curious arrangements, and the powder horn and bullet pouch that is carried by a modern war vessel is quite astonishing. There are three different styles of self-propelling torpedoes exhibited, and after looking at them it is easily understood why such protection as the torpedo netting, seen on H. M. S. Victoria, is put out whenever a war ship comes to anchor in the enemy's water. The armament is the same exactly as that on the vessels of this class in actual commission, and although the Illinois is stationary she could keep a belligerant fleet at a respectable distance from the world's fair grounds.

FOREIGN EXHIBITS.

It is surprising that foreign shipbuilders and owners have contributed so much to the success of the marine exhibit, when the prohibitive duty on foreign built ships is considered, but there will be, of course, many possible customers among foreign visitors. Many of the exhibits are, however, from passenger steamship companies whose source of revenue is largely American.

The United Kingdom surpasses any two countries together in showing fine models. The Victoria from Armstrong, Mitchell & Co., already described, is the finest and most attractive. The Fairfield Ship Building and Engineering Company's exhibit is next in point of interest, on account of the large number of models exhibited. They show the Lahn, Umbria, Marathon, Campania, Normania, Alaska and Etruria. On account of her recent performance, the model of the Dunnotar Castle is of interest. The paddle steamer Koh-i-noor on the Dover-Calais line is also included. J. & G. Thompson, Ltd., Clydebank, Scotland, is next in order. The model of a proposed ocean passenger express steamer to make 23½ knots and to carry four stacks is the finest model, although the 20½ knot cruiser Reina Regenta, the 22½ knot El Destructor, measuring 380 feet keel and having 3,800 horse power, the Ramillies of 14,300 tons and 13,000 horse power that turns up 17½ knots, as well as the Terpsichore, Thetis and Tribune, war vessels of 3,400 tons, 9,000 horse power and 20 knots, are worth looking over. In a technical sense the exhibit of Wm. Denny & Bro., Dumbarton, Scotland, should have been placed first, for more is to be learned



MODEL OF PADDLE ENGINES—WM. DENNY & BRO., DUMBARTON, SCOTLAND.

from it than from all other exhibits put together. A model of an inclined paddle steamer engine is shown. It is quadruple, having cylinders 32, 46½, 64½ and 92 inches by 60 inches, developing 4,600 horse power with 180 pounds steam. Several models of their fast paddle wheel passenger steamers, such as the Leopold II, which makes over 22 knots, are also shown. The most interesting part of this company's exhibit is two photographs of their experimental tank, the only private tank in the world, and which is believed to be the most complete. Many builders in the United Kingdom bring models to this tank for experiments. As closely as can be determined the ingenious mechanism that travels along with the carriage the length of the 300 foot tank registers the resistance and indicates the wave water line, so that in paddle steamers the paddles can be placed in water where the greatest effect is to be obtained. On account of the introduction in this country of the Purves furnace and the Serve tube, the exhibit of John Brown & Co., Sheffield, manufacturers of these specialties, will attract general attention. In addition to showing tubes and furnaces they have a crank-shaft, armor plate and a blade of a propeller wheel. A placard which should give lake builders confidence in the utility of the flues states that 10,000 of them are in use. The method of bending large plates is shown.

The Cunard line exhibit on the main aisle of the transportation building will cause many to stop, because the greatest passenger steamer in the world, the Campania, is represented by a model, and many photographs of her cabins, together with some fine paintings of the ocean "trotter" are there. It may be interesting to contrast the Brittania of this line, built in 1840, 207 feet long and having 740 horse power, with the Campania's 620 feet, and 26,000 horse power. Some of the ancient side-wheel transatlantic steamers are also shown. The Thames Iron Works and Ship Building Company, London, has models of the Blenheim, built in 1891, and a twin-screw steam yacht, wood-sheathed, built for the king of Spain in 1875.

The Compagnie Generale Transatlantique exhibit consists of a large number of panoramic paintings, which were a part of their exhibit at the Paris exposition. In 1892 this company's steamers traversed 2,500,000 miles. Some massive pier and dock building machinery is shown by paintings as well as models, from the Compagnie de Fives, Lilles. In this part of the gallery of the transportation building may be seen a complete model of the port of Dunkirque, as well as a model of the famous Forth bridge. Some nicely executed, but small, models of the Columbus fleet, Santa Maria, Pinta and Nina, are contributed by the municipality of Genoa, Italy.

The dock yard school Yokosuka, Japan, presents some of the handiwork of the students in the shape of a models of a Scotch boiler and an inclined triple expansion engine. The same exhibit contains a model of the twin-screw war ship Hashidate, built at the Imperial dock yard, Japan. A section of the ship shows that bamboo rods as well as cellulose are used in the protective cofferdams outside the coal bunkers which surround the engines and boilers. The horse power developed by this vessel is 5,400, and she makes 16 knots an hour.

The White Star line has a building of its own, some distance north of the transportation building, and it is deserving of a visit. It is easily distinguished by the deadlights in the walls, with life preservers decorating the rail of the promenade. Inside are models of the Teutonic and Majestic, and in addition to the practical illustration of the accommodations given different classes of passengers, some attractive bas reliefs are shown. The movements of the nineteen steamers of this company are recorded daily.

Two marine exhibits seem to have strayed out of the transportation building over into machinery hall. One consists of two triple expansion engines, the larger one developing 1,000 horse power at 100 revolutions, the smaller one of 200 horse power turning 150 revolutions, and both working with great smoothness and practically with no vibration or noise. The other exhibit is a sectional four bladed propeller wheel from E. Skoda, Pilsen, standing in a section all by itself.

Another exhibit that seems to be out of place is that of the Polsen Iron Works, Owen Sound and Toronto, Ont. It is a very neat little model of the Canadian government steamer Constance, to be found in the fisheries building. This is the alleged war ship which sensational newspapers were going to have bombard the cities on the great lakes. It was fully illustrated and described in the Marine Review some time since.

The Peninsular and Oriental Steam Navigation Company shows a diagram giving particulars of what is believed to be the greatest fleet in the world. It consists of fifty-three iron and steel vessels, the total tonnage of which is 221,807 tons and the total horse power 225,650. These steamers traveled during the year 1893, 2,600,000 miles. The company was organized in 1837.

Hawthorn, Leslie & Co., Newcastle-on-Tyne, present a model of the Orel of the Russian volunteer naval fleet. Furness, Withy & Co., Ltd., W. Hartlepool, show one of their very large cargo steamers, 400 feet long, 48 feet beam and 28 feet deep. Her dead weight capacity is 6,500 tons, and her engines are 32, 49 and 77 inches by 48 inches.

The Castle Mail Packet Company operating nineteen steamers between England and Africa have four pretty models. All but four of the boats are surnamed Castle, and beginning with Dunbar Castle of 2,608 tons and 1,500 horse power, they increase in size to the Dunnotar Castle of 5,465 tons and 6,500 horse power.

In view of the recent disaster to the Cleveland life saving crew, a life boat in model by R. & H. Green, Blackwell yard, London, should be examined. The German emperor inspected the boat last year and was so favorably impressed with it, that he suggested its use on the Baltic.

The Hamburg-American Steam Packet Company's exhibit is contained in a representation of an ancient barge. The Furst Bismarck of 9,000 tons and 14,000 horse power, and a speed of 19 knots, makes a very pretty model, as well as those of the Augusta Victoria, Columbia and Dania.

Yarrow & Co., the torpedo boat builders at Poplar, London, have furnished a model of the Destroyer, 180 feet long and 18½ feet beam, that has a speed of 27 knots. She resembles the torpedo boat No. 2, building at Iowa Iron Works, Dubuque, Ia.

In the German section in the gallery, charts of the Rhine

and German harbors are very profuse, but the section is worth going over on account of the models of war ships which are to be found there.

The Vulcan Works, Stettin, the largest shipbuilding concern in Germany, makes a fair exhibit of war ship models and drawings. Among the models is the Spree and one of the Furst Bismarck.

The traveler will be interested in the exhibit of Thomas Cook & Son, and this company's models of the Nile steamers will give ship builders some suggestions on light-draft river steamers.

A 15-foot propeller wheel with the complete shaft attached may be seen at the special building of the Krupp Works, in the southern part of the grounds near the entrance to the forestry building.

The Arsinal da Marinha, Rio de Janeiro, shows some models of marine engines that are astonishing to those who are not familiar with the work turned out by the Brazilian government.

The Russian navy is represented by two battle ship models and a torpedo boat mounted on a midship section of another battle ship.

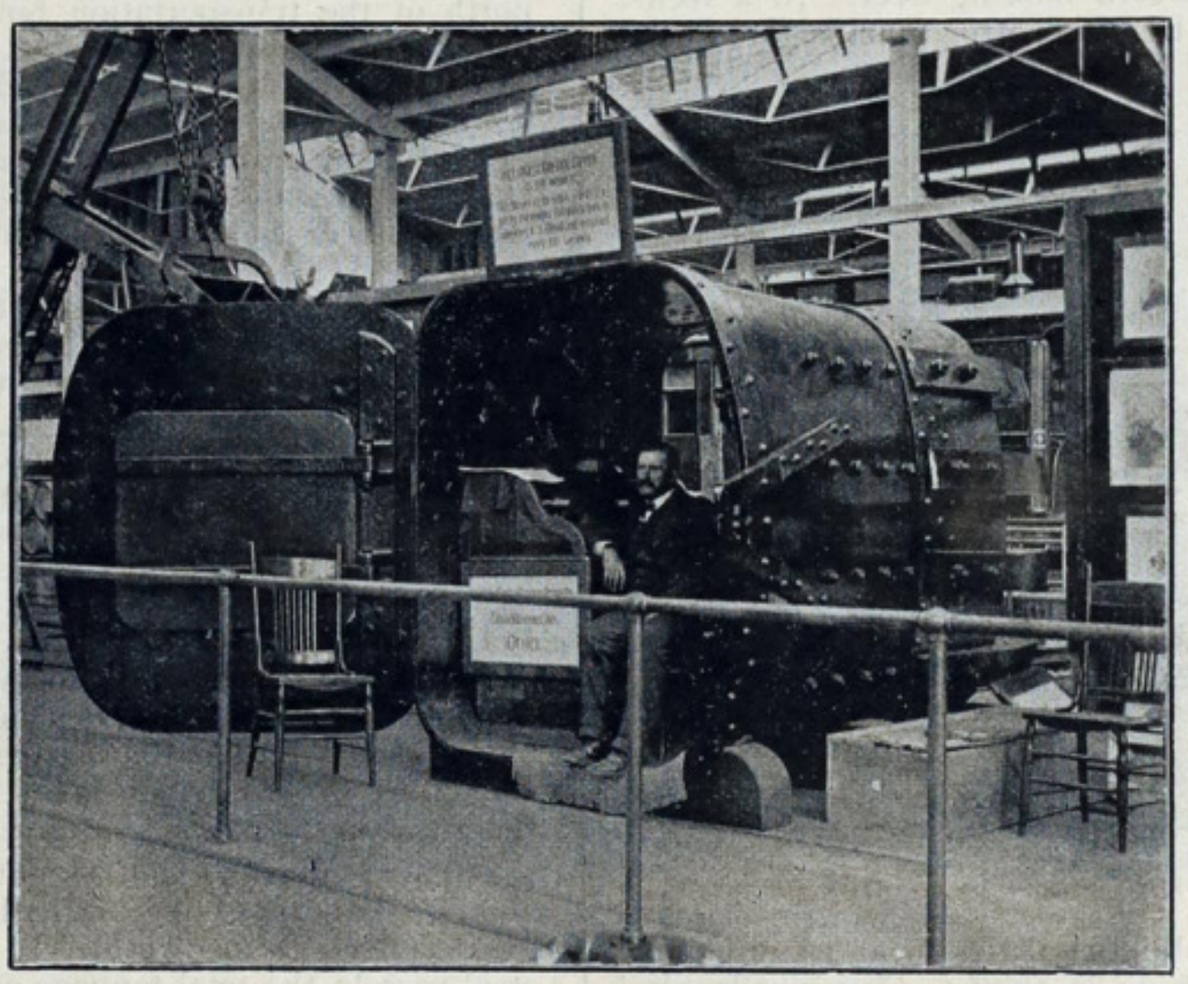
Dry dock owners and managers should examine the graving dock model from Table Bay, Cape Colony, So. Africa.

doubt about the integrity of the relic, it may not be worth while to visit the Convent La Rabida in the southern part of the grounds where the anchor is to be found with many other interesting things having some connection with the life of Columbus.

Rahjen's American Composition Company, 26 Beaver street, New York, N. Y., exhibit a model of a vessel in dock, one-half of which had been coated with their composition and one-half with some other composition. They also show a nice lot of barnacles.

The fleet of fifty electric launches in daily use on the lagoons and other interior waters at Jackson park can not fail to be of special interest to the visitors. Each boat in actual operation during the fair will cover an average of forty miles a day. The normal speed, as allowed by the authorities, is six miles an hour; this, however, may be exceeded by two miles more in cases of emergency. The boats are nearly 36 feet in length, with a draft of 28 inches, and will seat about thirty passengers each. The motive power is furnished by the Consolidated Electric Storage Company. Batteries and motors are placed beneath the seats and flooring, supplying power equal to the full carrying capacity of the boats. The Detroit Boat Works built a large number of the hulls.

In addition to the pumping station headquarters where one



DREDGE DIPPER—BUCYRUS STEAM SHOVEL AND DREDGE CO., SO. MILWAUKEE, WIS.

The Norddeutscher Lloyd Steamship Company shows models of the Meir, Carlsruhe, the Havel and the Spree.

Orlando Bros., Leghorn, Italy, show models of war ships built for the Italian navy.

The government dry dock at Sydney, N. S. W., is shown by a model.

MISCELLANEOUS EXHIBITS.

In Pratt & Letchworth's (Buffalo, N. Y.) exhibit of steel castings in the transportation building are some propeller wheels and some steel shafting.

The exhibit of the Penberthy Injector Company, machinery hall, 25-M-24, will interest marine men, as nearly 600 lake steamers are equipped with injectors made by this company.

The Belfast Rope Works Company and the Russian navy show some fine rope, but not any finer than that manufactured by the United States government for the navy and exhibited on the warship Illinois.

The chief attraction in the exhibit of the Bucyrus Steam Shovel & Dredge Co., South Milwaukee, Wis., is an immense dredge dipper, shown in an illustration, for which we are indebted to the Railway Review, Chicago, Ill.

Most any one would take the trouble to walk a half mile to see the original anchor of the Santa Maria, but as there is some

Worthington horizontal high duty engine, one horizontal triple expansion engine, two vertical engines with a combined capacity of 40,000,000 gallons a day, and two fire pumps, are all in operation, this great pumping engine concern has an exhibit in machinery hall, and in connection with other exhibits there are twenty places on the fair grounds where Worthington pumps are employed. This is a better endorsement than many exhibits. The exhibit of this company in machinery hall is made up of seven pumps in operation, supplying 24,000,000 gallons per day, and there are in addition thirty other pumps of various sizes. The water supply on the war ship is from a Worthington pump, and as an exhibit on the ship there is smallest sized pump for feeding a launch boiler.

The Joseph Dixon Crucible Company, Jersey City, N. J., have two exhibits at the fair, a display of pencils in the manufacturers building and a graphite exhibit in the mining building. In the latter, graphite in every form and every style of product is shown. There are crucibles, retorts and incandescent lamp filaments. In one case is shown fifty different varieties of graphite for rubber packing, "pot leading" yachts, paints, lubricating and the many other purposes for which it is used. One piece of graphite weighing 300 pounds is shown. Comfortable chairs and a writing desk are provided for the convenience of users of graphite. Chief Skiff wrote the Dixon people a very complimentary letter on the appearance of their exhibit and the promptness with which it was placed.

Around the Lakes.

Capt. William Brownlee, who sailed the schooner Hattie Wells, died at his home in Port Huron Sunday.

There is said to be more water at Grosse point than for two years. Vessels drawing 16 feet 10 inches have passed over the bar at this point without grounding, but this should not prompt careful masters to load beyond a reasonable limit.

Capt. Charles G. Penney, U. S. A., who has made many friends among marine men while on recruiting service in Cleveland, has been ordered to Pine Ridge Indian agency. Capt. Penney has had several years of experience in this duty and is a valued officer.

The American Shipmasters Association of 37 William street, New York, publishers of the Record of American and Foreign Shipping, classed during the past week the American bark A. C. Bean, American screw steamers Florida, Merida and S. S. Curry, American ship Solitaire, American three-masted schooner Susan H. Ritchie, British ship Euphemia and British half-brig Herbert.

Major James F. Gregory, corps of engineers, U. S. A., stationed at Milwaukee, informs us that the spars and jibboom of the wreck of the schooner Lumberman, about six miles off Wind point, and on the course from Racine to Milwaukee, were removed on Friday last. There is now no obstruction to navigation, as all parts of the vessel are more than 45 feet below the water surface.

Just thirty-three days were required to construct in Chicago recently the largest grain elevator in the world, and in one week after its completion the house, which has a capacity of 3,680,000 bushels, had 1,000,000 bushels of wheat in store. More than 8,000,000 feet of lumber were used in the construction of the building, which is of the ordinary crib style. The elevator is equipped throughout with electric lights and is completely furnished with all styles of modern machinery. From 600 to 900 men were continuously employed night and day in its construction.

British charts of Lake Superior cover the entire north shore. We have them for sale at $1.

TREASURY DEPARTMENT, OFFICE OF General Superintendent U S. Life Saving Service, Washington, D. C., June 21, 1893. Sealed proposals will be received at this office until 2 o'clock p m. of Thursday, the 20th day of July, 1893, for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30, 1894; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quantities named in the specifications. The supplies needed consist of Beds and Bedding, Blocks and Sheaves, Cordage, Crockery, Furniture, Hardware, Lamps, Lanterns, etc.; Lumber, Medicines, etc.; Paints, Oils, etc.; Ship Chandlery, Stoves, etc.; Tools, and Miscellaneous articles; all of which are enumerated in the specifications attached to the form of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 24 State Street, New York City; Superintendent Eleventh Life-Saving District, Grand Haven, Mich., and Superintendent Twelfth Life-Saving District, Appraisers' New Building, San Francisco, Cal. Envelopes containing proposals should be addressed to the "General Superintendent U. S. Life-Saving Service, Washington, D. C.," and marked on the outside "Proposal for Annual Supplies." The right is reserved to reject any or all bids and to waive defects, if deemed for the interests of the Government. S. I. KIMBALL, General Superintendent.

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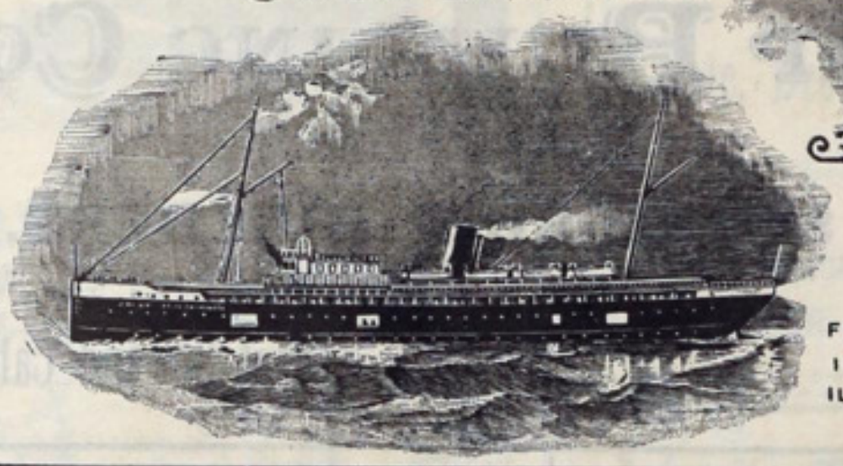

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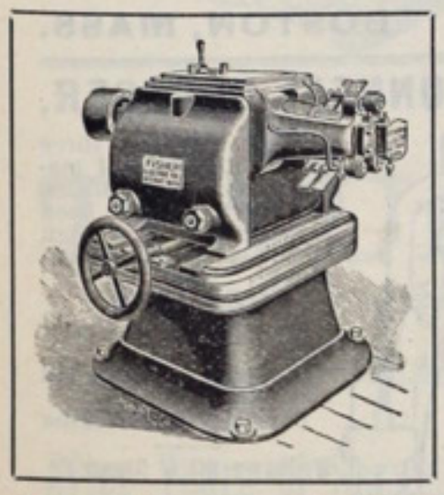

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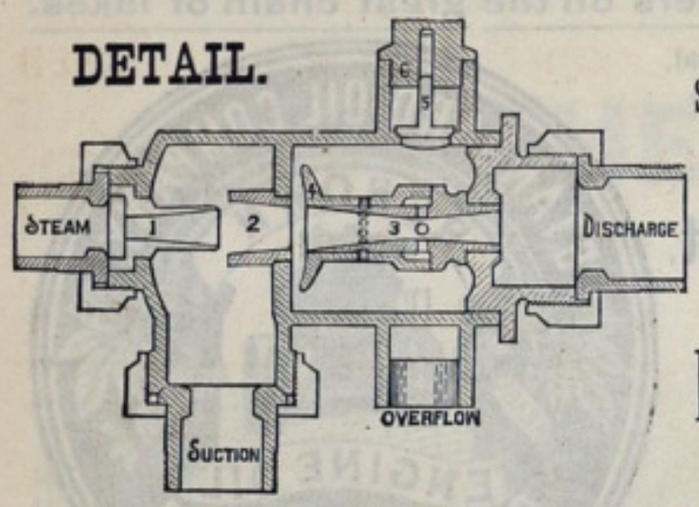

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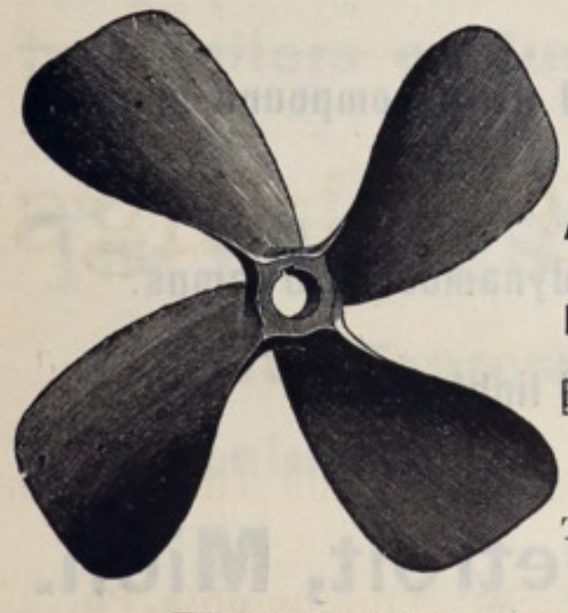

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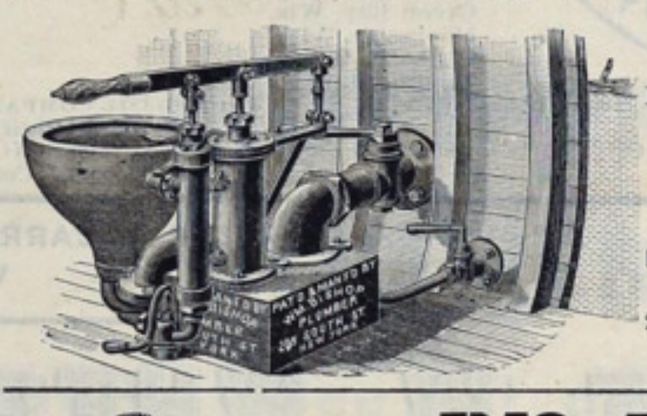

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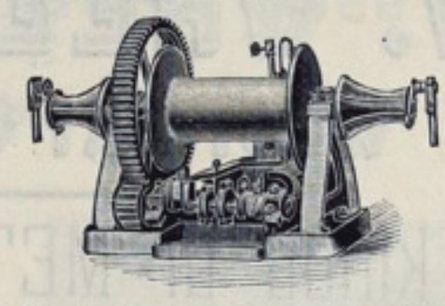

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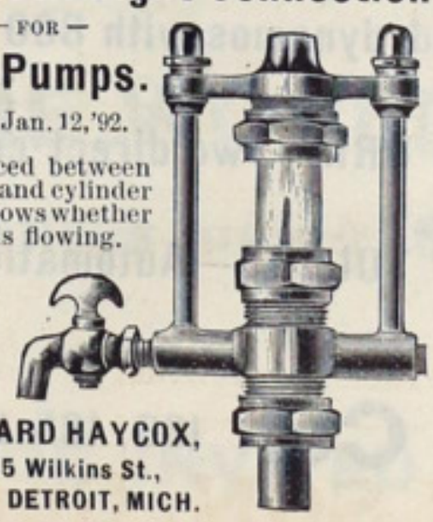

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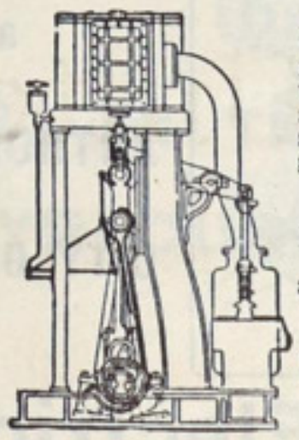

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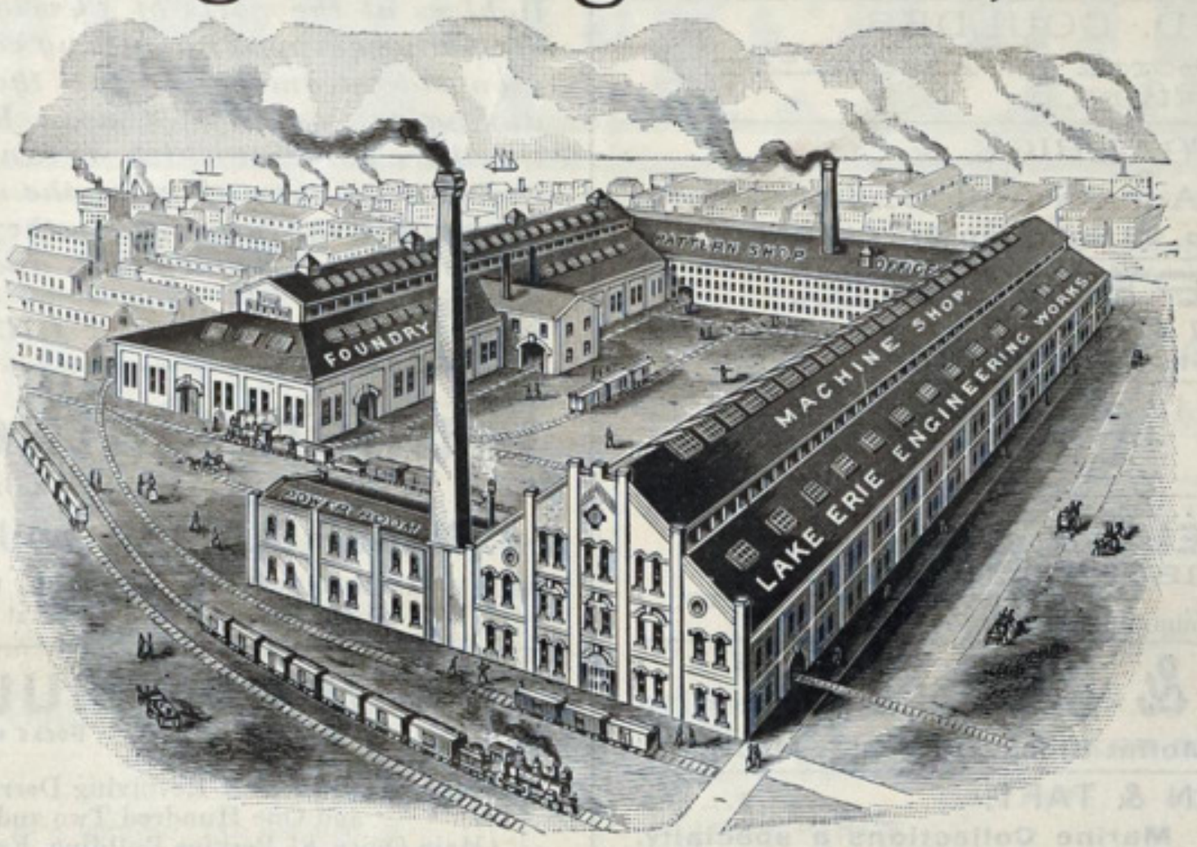

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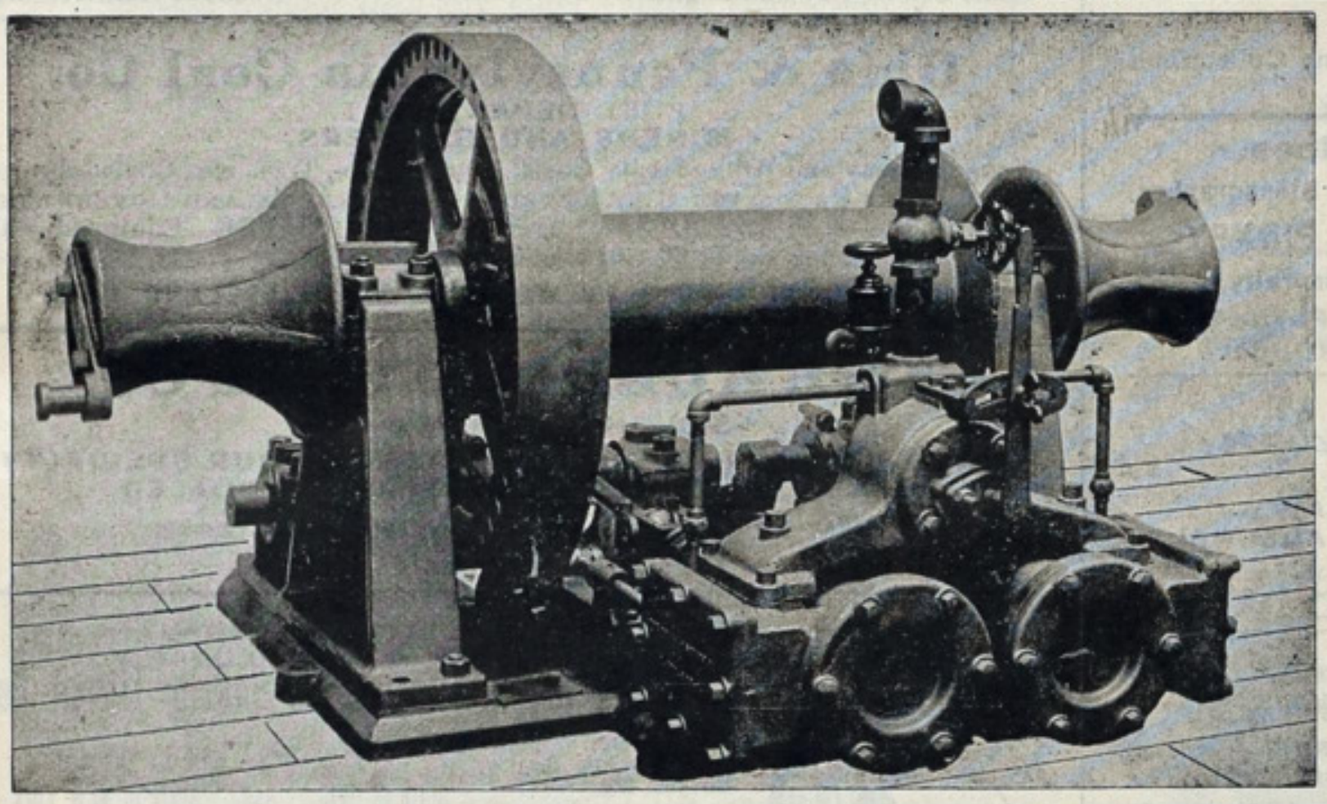

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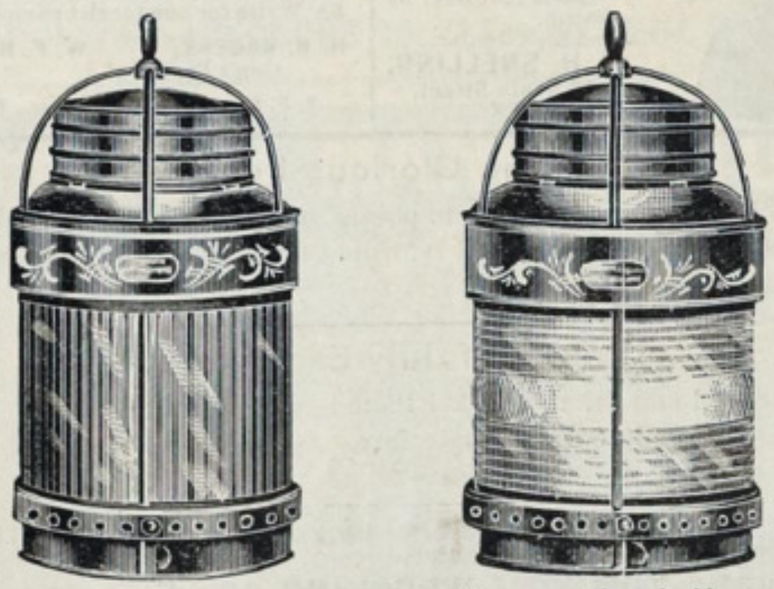

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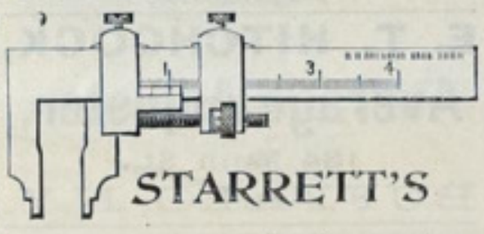

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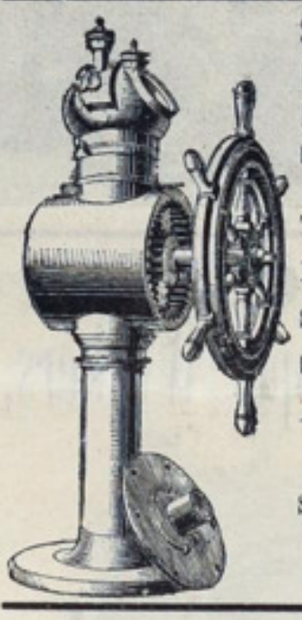

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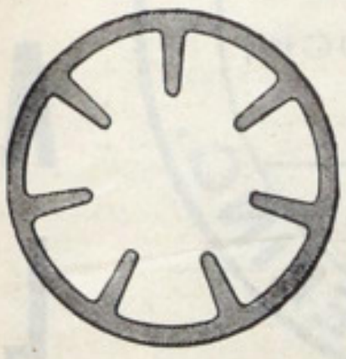

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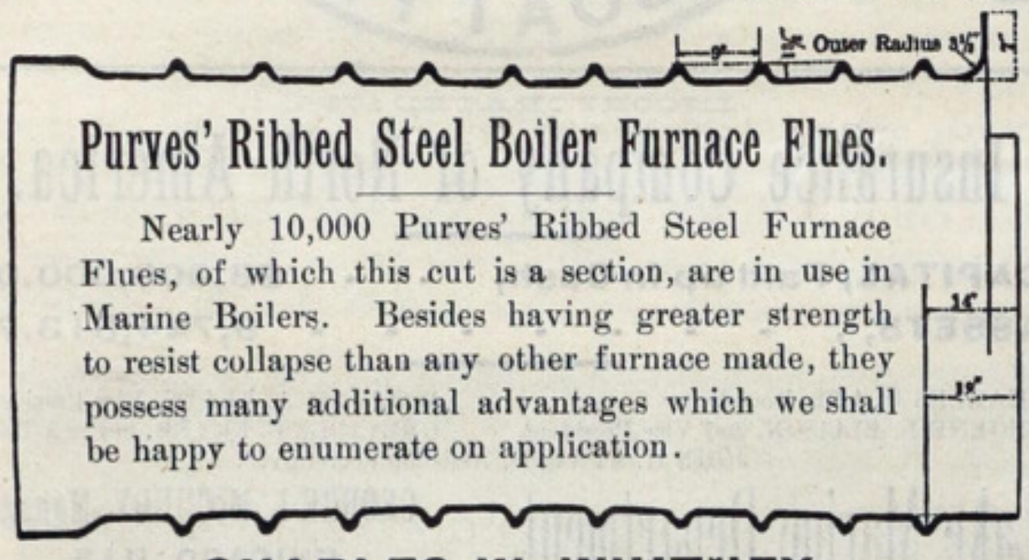

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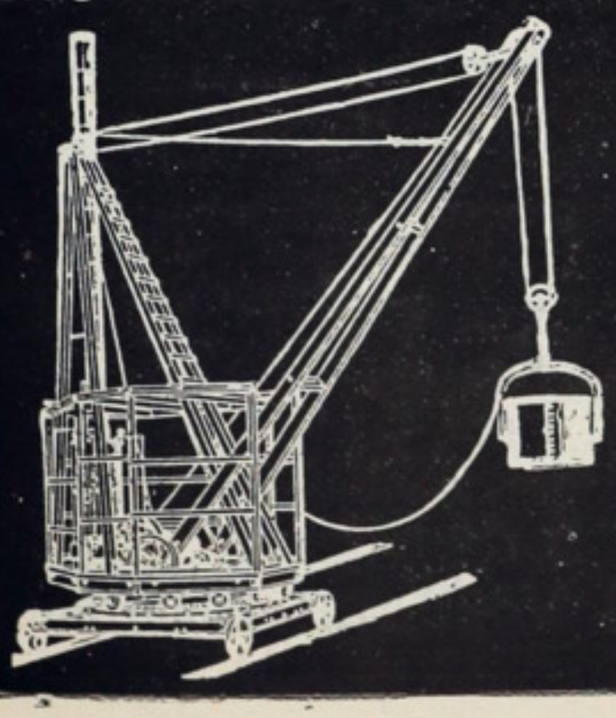

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